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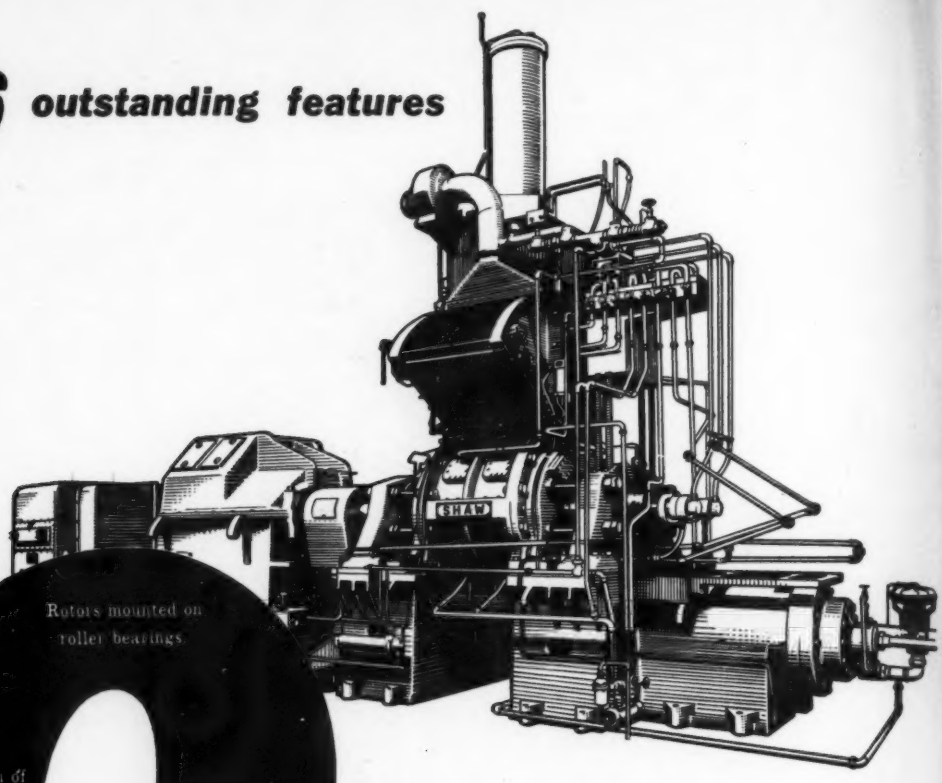

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IN ITS 76th YEAR

November 28 1959

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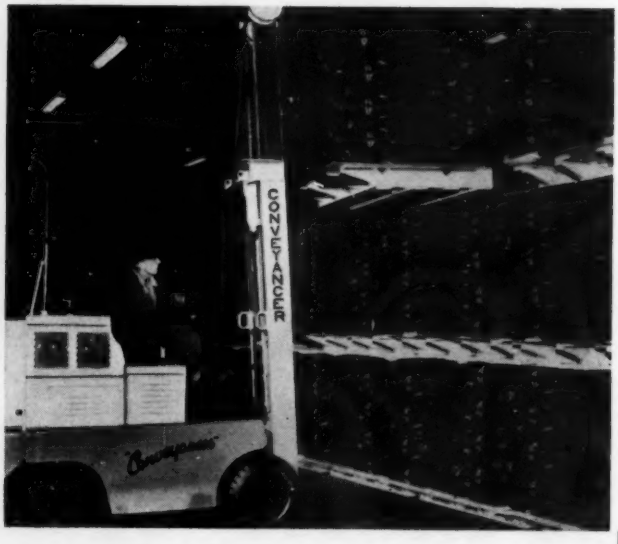

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NOTES of the WEEK

International Diplomas

IN his speech at the International Rubber Conference banquet in Washington earlier this month, Mr S. D. Sutton, leader of the IRI delegation, said that a high standard of technical education was essential for the proper development of the rubber manufacturing industry and he drew attention to the prestige and recognition accorded IRI diplomas in rubber science and technology. These diplomas, at Licentiateship and Associateship levels, were awarded as the result of examinations set at a high standard and all Western European countries participated in them under the aegis of an International Education Committee, the purpose of which was to obviate the need of membership of the IRI as a condition of the award and to ensure complete uniformity of standard and marking. Such awards, he said, were the mark of academic and technical skill and were recognized as such by rubber manufacturers and were indeed fast becoming essential for technical employment and preferment in the countries concerned. The rubber manufacturing industry in the United States was alone in not participating and Mr Sutton appealed to the US delegates present to come into the scheme and thus bring about something never before achieved — an industrial Diploma receiving universal recognition. In noting this challenge to our colleagues in the United States, we commend Mr Sutton's proposal to them not only as an act of international cooperation but because the concept of a universally recognized diploma set to a common standard would be attractive to candidates as well as to the industry itself by having adequately qualified staff at its disposal. Such cooperation would also inevitably bring American ideas and techniques into the examination which would be all to the good.

Consumer Goods in USSR

MEASURES to increase the production, extend the variety and improve the quality and finish of consumer durables and household goods, published last month in the Soviet press, indicate that the new consumer goods programme has been in preparation for some time. Alongside this is the recent introduction of hire purchase systems in the USSR. Production figures for 1961 (1958 figures are in parentheses), published by the Board of Trade, are worth recording. Those published include the following: Refrigerators, 796,000 (359,600); washing machines and dish washers, 1,215,000 (463,000); vacuum cleaners, 510,000 (246,000); sewing machines 3,470,000 (2,685,600); TV sets, 1,928,000 (979,300); motor-cycles and mopeds, 280,000 (25,000); children's bicycles, 1,565,000 (1,024,000); electric irons, 6,586,000 (2,086,000). These figures, while themselves little more than a drop in the potential ocean of USSR home demand, indicate at once the possibilities for exports from the UK (to say nothing of capital equipment) and an eventual USSR production capacity that may well in the future exert a considerable impact on our overseas markets, although, when that time comes, the entire world pattern will certainly have altered and expanded. There is also mention, in the published announcement, of the need for new materials, particularly plastics and synthetics, to be brought into use, and for the improvement of standards of design. The Councils of the Ministers of the Republics are to draw up plans for new design bureaux and research laboratories which are to be organized in 1960 in the leading consumer goods factories. Designers, it is stated, are to draw upon the best foreign designs as exhibited in the Soviet Union, as well as the best domestic designs.

Another 'D' Day

THE Union of South Africa's Minister of Finance has announced that the official change-over date or 'D' day ('D' for decimalization) for the new coinage system will be the second Tuesday of February 1961. The announcement has been made well ahead to facilitate planning. The Minister also announced it had been decided that all existing banknotes and silver coins shall be kept in circulation at unchanged values and that, with the exception of the 2s. 6d. coin, no special steps shall be taken to withdraw them from circulation. Reference to this decimalization plan and to those in Australia and India has been made before in these pages and there has recently been considerable correspondence in the national press concerning them. Most of the suggestions for UK decimalization favour the abolition of the half-crown as a practical step. Certainly a change in this country can resonably be viewed as overdue; more especially perhaps as there is already talk of the day when there will be a common currency in, at least, the EEC countries. It is, however, interesting in this connexion to remember that the UK has fewer coins and notes of different denominations than other Western European countries. The tally is as follows: Holland has five coins and eight notes; Spain has six coins and nine notes; France has seven coins and nine notes; Denmark has seven coins and five notes; Italy has eight coins and four notes; Germany and Belgium each have eight coins and five notes; Sweden has nine coins and seven notes; Austria has eleven coins and six notes (reversed in the USA—six coins and eleven notes) while in the UK there are eight coins and three notes for the lowest total of eleven denominations (excluding the sovereign, which we never see here, and the new £10 note shortly to be issued).

NEWS *Briefs*

US POLYPROPYLENE PLANT—KOREAN IMPORTS
MEXICAN PRODUCTION—RUSSIAN RESEARCH
UK/GUINEA AGREEMENT—NIGERIAN RUBBER

●**United States** — Hercules Powder Company has disclosed that it will build a multi-million dollar polypropylene plant at Lake Charles, Louisiana, designed for ultimate capacity in excess of 100 million lb. a year. This will be the second Hercules plant for the production of polypropylene. The first Hercules plant, which was also the only commercial polypropylene plant in North America for a year and a half, and one of the largest in the world, has been in operation at Parlin, New Jersey, since the latter part of 1957. Construction of the new and larger facility will get under way immediately, with completion of the first 50,000,000lb. unit scheduled for early 1961.

●**Guinean Republic** — A new trade agreement between the United Kingdom and the Republic of Guinea provides for the supply to the UK of a number of commodities including rubber. Plastics materials and raw materials for the manufacture of plastics, and tyres and tubes, will be exported to Guinea.

●**Korea** — 3,000 tons of raw rubber are to be imported by Korea under the first phase of the International Co-operation Administration programme for the financial year 1960.

●**Russia** — Experts from six Communist countries are meeting in Erevan, Soviet Armenia, to discuss research problems connected with synthetic rubber production in 1960 and 1961. Reporting this last week the Soviet news agency *Tass* said delegates from the Soviet Union, Czechoslovakia, East Germany, Poland and Rumania, and observers from China were attending.

●**United States** — The General Services Administration has announced in a circular to the rubber trade in Washington that it is currently offering for sale 35,000 long tons of high grade rubber comprising No. 1-X and No. 1 RSS. A GSA spokesman said the offering was a continuation of the GSA sales of rotation rubber which began last month.

●**Malaya**—The Malayan Government has announced that the compulsory cess on rubber small holdings will be raised to 4½ cents per lb. from the current rate of 2 cents in order to help speed up rubber replanting. In a statement, the Government said the increase would come into effect on January 1 1960. It explained that the Rubber Industry Replanting Board had recommended that in order to ensure adequate funds being made available to finance the continued replanting of small holders' rubber the rate of replanting cess would revert to its original state of 4½ cents from the level of 2 cents to which it was reduced on September 1 this year. It added that the Government had decided to accept the recommendation.

●**Nigeria** — The Western Nigerian Government has announced plans for increase in agricultural production to satisfy new needs created by the region's rapidly expanding population and rising standard of living. The increase, which is to be achieved with the help of a sharp speed-up in the dissemination of technological knowledge, is part of a new £165m. five-year development plan for the region, announced by the Government. Rubber production has been rising steadily in both quantity and quality, and the Government estimates that output during the next five years should increase by 10% at current prices. The authorities plan to encourage the improvement of quality by the distribution of 2½ million clonal seedlings per year, starting in 1960. The Western Nigerian Government is also establishing a regional Rubber Research Station at a cost of £190,000. This may later be expanded into a Federal or Inter-Territorial Institute.

●**Argentina**—Argentina has approved an investment proposal by Texas Butadiene and Chemical International Ltd., subsidiary of Texas Butadiene and Chemical Corporation, New York, of US$39 million in an Argentine company to be formed for the installation of a petrochemical plant in Puerto Deseado, Santa Cruz. The factory is expected to start production in two years, with an initial output of 30,000 tons of butadiene, 40,000 tons of synthetic rubber, and 15,000 tons of smoke black, later increasing to 42,000, 60,000 and 25,000 tons respectively.

●**Egypt**—Yugoslavia will buy motor car tyres and phosphates from Egypt to a total value of £1,000,000, it is announced in Cairo.

'Let's call them Greengate and Irwell!'—460

●**Mexico** — In 1958, Mexico's rubber industry considerably surpassed its production figures of 1957 with almost all basic items, with the exception of bicycle inner tubes and rubber hose, registering strong increases. Automobile and truck tyre production in 1958 showed a rise of 17% over 1957, despite the fact that one of the most important companies suspended operations following management-labour conflicts.

International Rubber Conference

OVER 1,500 ATTEND AT WASHINGTON

Dr F. Banbury Presented with Charles Goodyear Medal

WITH over 1,500 registrations the International Rubber Conference, jointly organized by the Rubber Division of the American Chemical Society, the American Society of Mechanical Engineers, and the American Society for Testing Materials, in Washington, from November 9-13 was a resounding success.

The description 'international' was also completely justified with 110 overseas visitors, including over 40 from Britain. There were delegations from USSR, Poland, Czechoslovakia, Germany, Denmark, Holland, Sweden, France, Italy, Malaya, and a large contingent from Canada.

Over 75 papers were given in the five days and were of a consistently high standard. A bound preprint of the papers was given to all attending the conference and this move gave rise to some discussion. Whilst many welcomed it, as many thought it was a mistake. Some of the authors complained that they had not had the opportunity of correcting errors on proof, and many would have preferred to have waited until after the conference so that the discussion on each paper could have been included. Nevertheless, the organizers are to be congratulated on the production of a volume of considerable size, which gave the speakers of some of the longer papers the opportunity of emphasising and expanding upon specific points in their papers rather than reading the whole.

Following an introductory talk by Dr Wallace R. Brode, science adviser to the US State Department, the conference got down to business with a paper on a new mixing machine which created considerable interest—the Rotomill. This paper is reprinted in full on page 671 of this issue.

A general discussion of the material given in the scientific papers written by Dr W. C. Wake, of RABRM, will appear shortly in *RJIP*, whilst Dr H. Stern will be discussing some of the technological papers.

A small exhibition of synthetic rubbers, processing machinery and testing and control equipment was held in conjunction with the conference. Among the items which attracted particular interest was a new tensile testing machine by Scott Testers, a tumbling machine for use with liquid nitrogen to remove the flash on moulded silicon rubber products, and the Wallace-Shawbury curometer (*RJIP* June 6 1959 p. 858) which gave Mr H. Bennett a full-time job in explaining it to visitors.

The climax of the conference came on the Thursday night with the banquet which was preceded by the suppliers' cocktail party. During the banquet the 1959 Charles Goodyear Medal—highest honour in American rubber chemistry—was presented to Dr Fernley H. Banbury 'for the invention, development and commercialization of the Banbury Internal Mixing Machine.'

Dr H. L. Fisher gave a brief biography of Dr Banbury. Dr Banbury was born on December 22 1881, in Cornwall. His father was a successful agriculturalist with interests in local political affairs. After serving his apprenticeship in a machinery factory in Plymouth he studied mining in Penzance. He was to go with an uncle to India, but he missed the boat. If he had not missed that boat, said Dr Fisher, while there would probably have been an internal mixer, there would not have been a Banbury mixer. He went to America instead, studied electrical engineering at Purdue University where he gained his B.Sc. in 1906.

During a spell in Europe while working for Werner Pfleiderer on dough machines for baking, he got the idea of an internal mixer.

He returned to America in 1916 and joined the Birmingham Iron Foundry in Connecticut. Goodyear took the first Banbury mixer that year and others followed. Now there were over 2,000 in use throughout the world. Dr Banbury, who retired in 1952, holds 26 American patents and has received many honorary degrees and awards.

A scroll, a cheque, and the Goodyear Medal were then presented to Dr Banbury by Mr E. H. Krismann, chairman of the Rubber Division.

Prior to the presentation, Mr A. E. Juve, general chairman of the conference, introduced the head table and called upon Mr J. M. Buist to speak for the overseas visitors.

Mr Buist said it was a great honour to respond for the international guests. There was no nation more adaptable to change than America. Some of the scientific effort that went on behind those changes was summarized by the papers given that week. In the preprint there was a real treasure house on which they could draw. Those who attended, however, had the inestimable value of personal discussion with friends. Their American hosts were most frank in their discussions on mutual problems and Mr. Buist stressed how much they appreciated how open their hosts were in showing plants and technological advances to visitors.

This conference had provided them with the opportunity to pause in their labours and gain knowledge and inspiration. All the overseas visitors thanked their hosts for the care and welfare devoted to them, and the excellence of the fare and hospitality.

Mr S. D. Sutton brought greetings from the IRI delegates and from their president, Sir J. Dean. After describing the aims and work of the IRI he remarked that their technical diplomas were now accepted in Europe. They would like to see them accepted in the US also and he put this forward as a suggestion to the sponsors of the conference. Mr Sutton said that in the not too far distant future he thought there would be an all-embracing Institute for High Polymers in Great Britain.

He invited those present to attend the IRI International Conference to be held in May 1962, probably in London.

Dr Fromandi then extended an invitation to an International conference to be held in West Berlin from October 4-7 1960, when there would also be an exhibition of processing and compounding materials and machinery, including synthetic fibres.

During the five days of the conference there were many other enjoyable functions such as the visits and tours arranged for the ladies, the breakfasts, dinners, and receptions arranged by individual supplier firms, and the 25-year Club luncheon for those who have served 25 years or more in the industry and to which overseas visitors were welcomed.

The excellent arrangements and organization made by the sponsors were beyond praise and went far to ensure an enjoyable and rewarding week which will long be remembered by those who attended 'the best international rubber conference ever held.'—J. D. C.

Photographs by arrangement with 'Rubber Age,' New York

A Continuous Mixing Device

THE ROTOMILL*

PRIOR to the introduction of internal mixers in the 1920s all dry rubber compounds were mixed on open mills. Since the 1920s the use of internal mixers has expanded rapidly, so that today almost all large volume mixing is accomplished by these devices. The evolution of these mixers in the last 30 years has been in the direction of higher speeds, higher power, and greater automation. However, there has been no radical change in the concept of their operation and the method is still a batch method.

In the meantime a number of attempts have been made to develop a continuous process in which the rubber and pigments are fed automatically and continuously to a device from which the mixed stock is discharged continuously. None of these devices has made any appreciable impact on the industry, presumably because of one or more deficiencies.

The method, which is the subject of this paper, represents a somewhat different approach to the problem and has a number of virtues which recommend it for consideration.

Design

The Rotomill consists essentially of a tapered, fluted rotor revolving in a smooth tapered stator. The flute shape is shown in Fig. 1. Each flute functions as the nip of a roll mill. The material in the banks passes through the close clearance between the tops of the flutes and the stator to achieve the intense shear required to produce a good mix. The taper of the rotor and the stator allows adjustment of the clearance to give varying degrees of shear and may also maintain the optimum clearance as wear occurs.

The flutes on the rotor (Fig. 2) are arranged in a spiral to move the material through the mill. This figure also shows the assembly of the rotor in the stator and the two feed chambers. By adding the polymer continuously at the first hopper on the right and the dry pigments continuously in the second hopper, a continuous mix is accomplished with the mixture being discharged at the left side of the apparatus.

The above description applies specifically to a laboratory version of the machine in which the rotor diameter at the large end is 3in. This is a useful laboratory tool for studying mastication and mixing because clearance, speed and temperature can be varied over a wide range. Also, not shown in the photograph, is an enclosure by means of which the effects of varying atmospheres can be studied. This is achieved by imposing a slight positive pressure on the desired gas in the enclosure. Manipulations are carried out by hand through rubber cuffs to prevent excessive leakage of the gas.

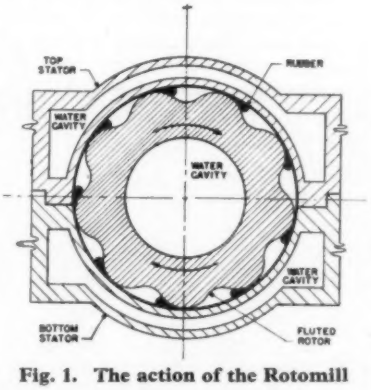

Fig. 1. The action of the Rotomill

In this version of the Rotomill the angle of the flutes with a plane perpendicular to the axis of the rotor is about 75°. As this angle decreases, the throughput of the machine increases and the intensity of mixing decreases. Experience with this modification has shown that the mixing intensity is greater than is required and complete mixing occurs with a travel of about 1in. beyond the pigment feed hopper. Subsequent work indicates that this angle should probably be between 45° and 60°.

It will be noted that this apparatus has a split stator and an outboard bearing at the discharge end of the rotor. The split stator is useful in studying the mixing performance, but is not necessary in a more practical version of the machine. The outboard bearing is also not necessary. It was apparent early in the development that the construction of a commercial unit would be roughly similar to that of a conventional extruder.

A 5½in. machine was built as an addition to an existing National Rubber Machinery Mil X Truder and has been operated as a laboratory machine to study various mixing operations. This is illustrated in Fig. 3. The extruder section shown at the right of the illustration was not intended to be part of the Rotomill, but experience has shown it to be a helpful adjunct to the preparation of certain mixes. The first Rotomill section is 12in. long and has flutes arranged at a 45° angle. This was done to facilitate the feeding of lumps of polymer into the machine. The second Rotomill section is 18in. long and has flutes arranged at a 67.5° angle. The feed hopper for this section is 12in. long and may be divided into two or three smaller openings depending on the number and quantity of ingredients to be added. The preferred procedure is to introduce the polymer as crumb or pellets in the first Rotomill section. By the time the polymer reaches the first hopper for the addition of dry pigments, some mastication has occurred and fresh surfaces are exposed to the pigment.

The machine is powered with a 30 h.p. motor and may be operated at speeds up to 60 r.p.m. The rotor is cored to provide cooling or heating and the stator is similarly jacketed.

Some work has been done in which a short extruder screw has been added at the output end of the Rotomill

This paper was presented at the International Rubber Conference, Washington, D.C., which was held on November 8-13 1959, by A. E. Juve and J. R. Beatty, both of the B. F. Goodrich Research Centre, Brecksville, Ohio, and R. H. Cline of the National Rubber Machinery Co., Akron, Ohio. It is reprinted from pp. 1-4 of the official conference preprint.

INTERNATIONAL RUBBER CONFERENCE

(facing page)

Among those present at the International Rubber Conference were: 1, F. N. Bennett (H. W. Wallace and Co. Ltd.) and Ernest R. Thornley (I.C.I.). 2, Harry Willshaw (Dunlop), Thomas Hancock Medalist; Fernley H. Banbury, Goodyear Medalist; and Joseph Brown (David Bridge and Co. Ltd.). 3, Dr W. C. Wake. 4, L. Mullins. 5, Presentation of the Goodyear Certificate of Award; E. H. Krismann, R. F. Dunbrook, F. H. Banbury. 6, J. Newnham (Dunlop) and S. O. Sutton (Veedip). 7, Jack Buist, Mrs Buist and John D. Copeman (Maclaren and Sons Ltd.). 8, Soviet rubber technologists visiting the Palmerton Publishing Company booth at the International Rubber Conference; second from left is Mr A. P. Bogayevski, editor-in-chief of 'Kauchuk i Rezina'; on the extreme right is Mr Winterhalter, interpreter from the US State Department. 9, James N. Rice (Natural Rubber Bureau) and Leslie Bateman (BRPRA)

section along with a die. This permits simultaneous mixing and extrusion. By the use of a short extruder section without a die the mix may be discharged as well-formed, compact pellets.

Operation

A fundamental requirement for efficient operation is that the space between the flutes must be only partially filled with stock. When this space is full the interchange of stock between flutes is low and a considerable portion of the material does not participate in the rolling bank. For this reason the Rotomill does not generate pressure sufficient for extrusion. When an extrusion screw is added at the exit end it must be designed to accommodate the output from the Rotomill.

Because of the good cooling facilities of both the rotor and stator, and because of the small masses of rubber in the banks, it is possible to keep the temperature of the mix low. Because of this it is usual to add all the curing ingredients in the one operation.

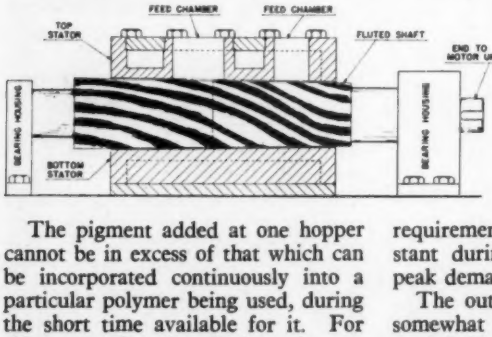

Fig. 2. Assembly of the Rotomill

The pigment added at one hopper cannot be in excess of that which can be incorporated continuously into a particular polymer being used, during the short time available for it. For this reason there is a limit to the rate at which a pigment may be added at one hopper. However, this varies widely depending on the polymer, the fineness of the pigment, etc. It is for this reason that two and sometimes three pigment hoppers are provided.

For a particular design of rotor the output of the Rotomill is proportional to the speed of the rotor. However, the highest speed which can be employed is limited by the ability to remove heat. With the 5½in. machine described above and with ordinary city cooling water a practical speed for mixing a tyre tread stock with a maximum mix temperature of 200° to 220°F. is about 40 rpm.

For continuous operation the ingredients to be mixed must be in a form which can be weighed continuously. This is no problem with the dry pigments or oils. Rubbers should be pelleted or available in granulated form. Automatic feeders are available which will weigh to an accuracy of about 1%, so that variations from this source are small. A separate feeder for each material or ingredient is probably the best practice, but in many cases a preblend of two or more ingredients can be used effectively.

The effect of varying the clearance between the top of the flutes and the stator is not yet clear cut. It appears to have very little effect on the output, but experience indicates that a larger clearance is required for good mixing with the 5½in. machine than with the 3in. machine.

The power consumption per lb. of mix produced is equal to or slightly greater than that required in a typical internal mixer depending on the specific stocks being compared. It is of interest to mention that the power requirements of a Rotomill are constant during operation and no high peak demands are involved.

The output of this machine varies somewhat depending on the type of stock being mixed but for a tread-type stock it is about 100lb. per hour.

Advantages of the Design

The design is extremely simple with no mechanical problems requiring solution. When the optimum clearance for best mixing performance is established it can be maintained constant for long periods of time. The facilities for removing heat are very good, so that a very close control of mixing temperature may be maintained. A complete mix can be accomplished in a single step, thus decreasing the number of operations and decreasing the in-process inventory of stock. A good mix can be accomplished with a great variety of stocks by suitable adjustment of the variables of rate of feeding, temperature, clearance, and order of addition of ingredients.

Design of Larger Units

It is not anticipated that any great problems will be involved in scaling up the design of the Rotomill to provide larger production. However, the data up to the present time are inadequate to permit an accurate calculation of the output of a larger machine. Very roughly, the output should depend on the number of flutes, the angle of the flutes, and the speed of the rotor. The mixing length—*i.e.*, the length beyond the last feed hopper —need not be any longer for a large diameter rotor than for a small diameter rotor provided the same flute angle is employed.

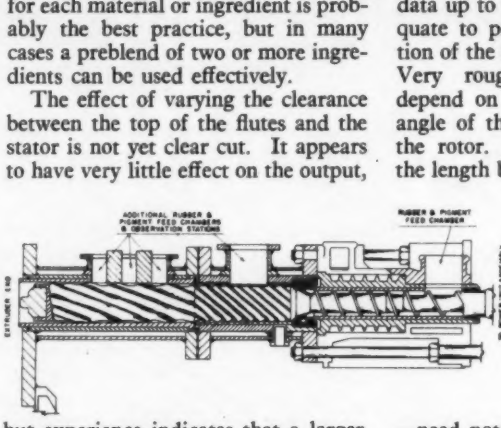

Fig. 3. A Rotomill of the 5½-in. type

A 10in. machine has been designed, but not yet built, and some preliminary calculations have been made for a 20in. machine.

Mixing Experience

An exceedingly wide variety of materials have been mixed on a test basis with the 5½in. machine. These have ranged from mixes employing a liquid polymer to those employing very viscous rubbers. They have included adhesives, hard rubbers, gum stocks, tread stocks, and many others. The Rotomill can function as an effective masticator and can also be used as a warm-up mill to feed another piece of equipment. It functions very well for plasticizing PVC and is effective for blending polymers.

An illustration of the results obtained on a 4-hour run of an SBR tread stock may be considered as typical. In this run two feeders were employed, one of which fed an SBR-carbon black master in granulated form, and the other a preblend of the zinc oxide, sulphur, accelerator, stearic acid, and antioxidant. The feeder used for the preblended pigments was of too large a capacity for the quantity required and hence was operating at lowered sensitivity and the metering was at a slightly irregular rate, as will be evident from the data.

The conditions of the run were as follows:

Clearance: 0.020in.
Rate of throughput: 100lb. per hour.
Temperature of stock at discharge: 210° to 220°F.
Speed of rotor: 40 rpm.
Power consumption: 17 hp.
Temperature of cooling water: 100° to 110°F.

Continued on page 691

Kunststoffe 1959

FOURTH REPORT ON DUSSELDORF PLASTICS EXHIBITION

ALTHOUGH much of the stand space taken up at the Düsseldorf Plastics Exhibition was occupied by German and other European manufacturers, a few British firms put on an excellent display of their products.

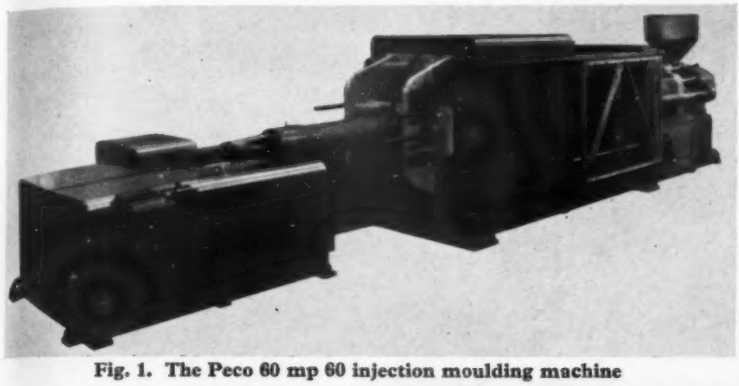

Fig. 1. The Peco 60 mp 60 injection moulding machine

Among the British firms exhibiting was Peco Machinery Sales (Westminster) Ltd., on whose stand four injection moulding machines were shown, the Peco 60 MP 60 (Fig. 1) and the 30 MP 40 (Fig. 2). The former machine has a shot capacity of between 60 and 90oz. and the latter a capacity of between 8 and 11oz. The other two machines had capacities between 4½ and 6oz., and in the case of the small model a shot capacity of 1oz.

The two main design features of the machines are the 'Thermax' heating chamber, which was appearing for the first time on the Continent, and the in-line preplasticizing unit. As a result of these two features a better quality product and a faster time cycle can be obtained.

The 'Thermax' heating chamber, which is of new design, can reduce the time cycle by almost 50% as against conventional plasticizing units. The main reasons are (a) that the heat is applied to the plastic material from the centre by the use of electric elements in the spreader as well as from the chamber wall, making a more uniform plasticizing process, and (b) the spreader is technically designed to give minimum resistance to the passage of the plasticized material. (Fig. 3.) As a result of this there is a complete homogeneity in the injected material which helps in the production of the end product.

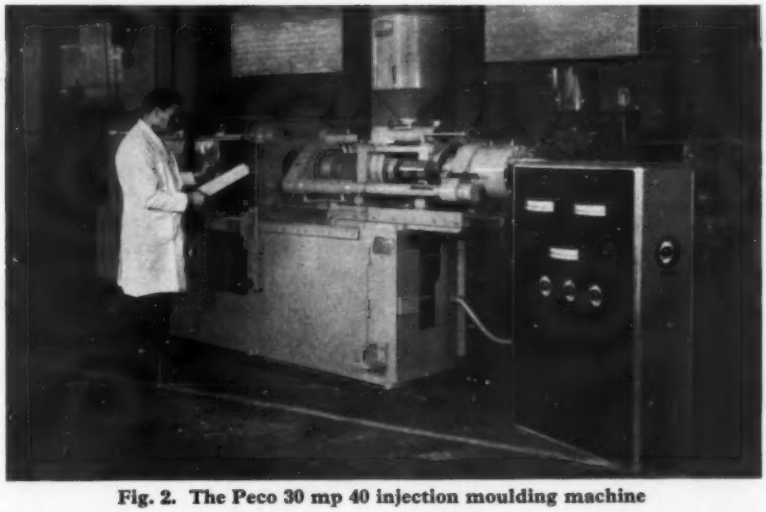

Fig. 2. The Peco 30 mp 40 injection moulding machine

The in-line pre-plasticizer unit shown at the exhibition can give pressures for normal production of between 15,000 psi on fully plasticized material with potential pressures of between 10,000 and 30,000 psi for fast mould filling of thin section.

On the Windsor Stand much emphasis was given to injection moulding machines and among others the W15 model and the AP 200 model (Fig. 4.) were shown.

The W 15 injection moulding machine is a normal capacity machine with a 4oz. shot and with a plasticizing capacity of between 35 and 40lb. an hour. The number of shots per hour is between 250 and 300 and the injection plunger takes a total load of 44,000lb. The distance between the tie bars horizontally is 12½in. and vertically is 7½in., the mould opens 9½in. and has a 5in. adjustment. The maximum moulding area is 60 sq. in. with a heating unit using 4kW. and the whole machine driven by a 15 hp motor. This machine can operate either by hand or semi- or fully-automatic as required. The machine is fitted with a safety control so that should an obstruction occur between the mould faces then the machine is switched off.

The big machine, the AP 200, has a maximum capacity of 124oz. of polystyrene, 107oz. of polythene, 136oz.

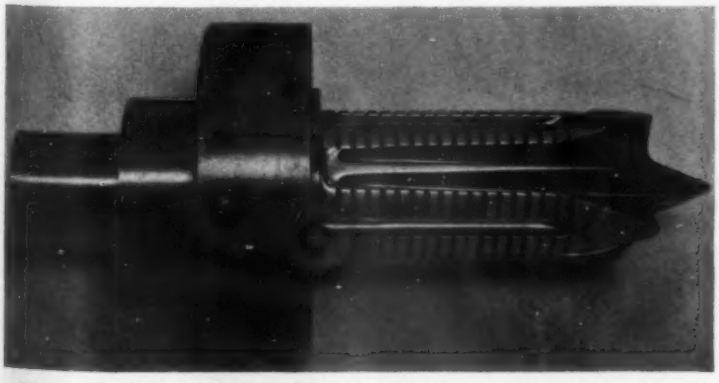

Fig. 3. The 'Thermax' spreader gives minimum resistance to material

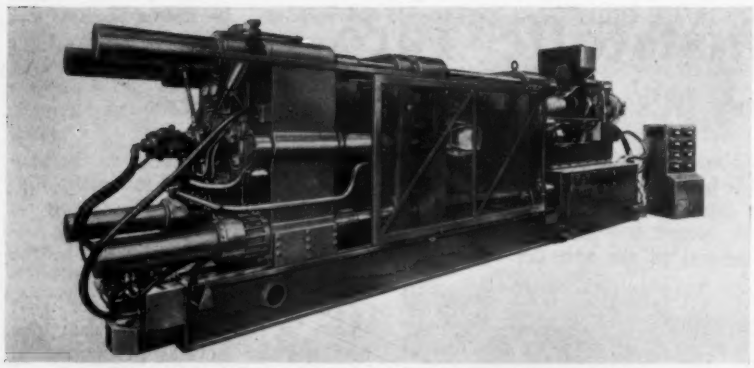

Fig. 4. The Windsor AP 200 injection moulding machine

of acrylic and 153oz. of cellulose acetate. There is a two-stage injection unit and a hydraulically operated mould height adjustment, the output from the machine is up to 350lb. an hour of polystyrene and *pro rata* for the other materials. The total load on the plunger is 157,100lb. and the plunger has a stroke of 17in. The locking force is 800 tons and the size of the mould plates is 51in. vertical x 51in. horizontal, allowing a maximum mould size of 51in. x 33¼in. The mould opens 36in. and there is a 20in. adjustment. The total heating is 36kW. and the whole machine is driven by a 50 hp motor of 720 rpm.

Automatik H. Hensch und J. Kaupp, Aschaffenburg/Main, showed a range of automatic string cutters for use in cutting 'spaghetti' of between 1.5 and 4mm. diameter. There were four types of machines shown. (Fig. 6.) Models FKS 5, FKS 12, FKS 25 and FKS 25 duo. With 2mm. diameter strip, the first model takes 10 strips, the second 25, the third 50 and the last model 100, the speed rate ranging from between 15 metres a minute and 100 metres a minute according to the machine. The power input for the four machines, respectively, is 1.1kW., 2.2kW., 5.5kW. and 9kW. The cutter is so designed to handle the strings either moist or dry as they come through the extruder or autoclave. The design incorporates non-corrosive materials and the parts of these machines are very readily exchangeable. The feed rate is controlled by infinitely variable speed box and the pellets can be cut in lengths of between 1.5 and 5mm. The strips are fed automatically and the cutting roller—with inclined blades—cuts to the required length. The value of these machines is their ability to cut pellet without burrs or tails and also a number of filaments can be cut at once without the use of bulky machinery.

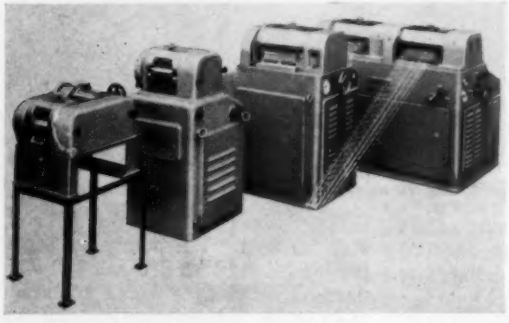

Fig. 6. The range of H. Hensch and J. Kaupp string cutters

On the stand of Fried. Krupp was a very interesting machine (Fig. 5) for the extrusion and rolling of calendered sheet, which attracted much attention. Amongst other things, this company specializes in designing machines suitable for the extrusion of rigid sheet, *e.g.*, with the model P 150 machine it is possible to extrude the rigid sheet approximately 50in. wide by ⅜in. thick. After extrusion the sheet passes through a three-roll polishing band and then through the haul-off gear which is fitted with a cooling tank for use with polythene flat film. Apart from the extruders and other ancillaries it was very interesting to see the type of die produced for use in the ex-

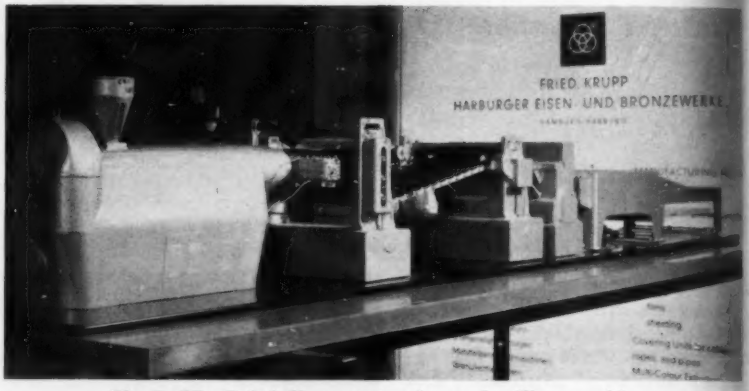

Fig. 5. The Fried. Krupp extrusion and rolling machine

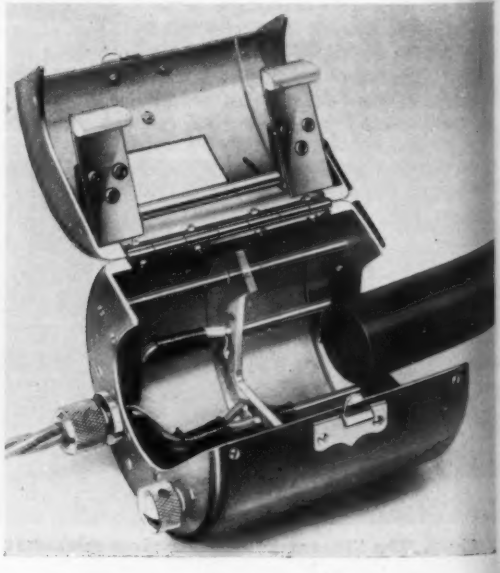

Fig. 7. The detector head of the Haynes and Haynes plastics tube thickness monitor

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Fig. 8. The control panel of the Haynes and Haynes plastics tube thickness monitor

trusion of sheet. With the P 150/20 model, which is a single screw machine, the screw to diameter ratio is 20 to 1 with a 150mm. screw which rotates between 12 and 48 rpm. The output from this machine is between 180 and 220 kilos an hour using an 80kW. motor and 67kW. heating capacity which in comparison with other machines is perhaps high but may especially be necessary in the extrusion of sheet. This firm also manufactures a twin screw extruder with a screw ratio of 22 to 1 and with 60mm. screws which gives an output of between 20 and 30kg. an hour with polyamides. The motor rating for this machine is 8kW. and the heating capacity 17kW. Apart from the standard model of extruder made for wire coating, pipe and tubing, strip, blown film and rigid sheet, there is a special wire covering extruder produced with a cross head and a 40mm. screw complete with a wire straightener, cooling trough, take-off gear, a dual wind-up and control panel built into the machine.

On the Johann Fischer stand was demonstrated the tube thickness monitor manufactured by Haynes and Haynes Ltd., which attracted a great deal of attention from visitors. This monitor is designed to measure the wall thickness and concentricity of tube as it is extruded.

This equipment is simple to install and operate and consists of a detector head (Fig. 7) which is hinged to allow it to clip round tube at any time after the extruder has commenced operating, the information is then fed back to the control cabinet which is pre-set to the limits required (Fig. 8). The wall thickness of the tube is shown on the instrument at the top of the panel and if any variation takes place a warning system operates either by lights or bells as required. The great advantage claimed for this monitor is that the quantity of scrap is greatly reduced and it is also possible to operate the extruder much nearer its optimum speed. Another interesting feature is that each electrical circuit is separate so that if anything goes wrong it is very simple to remove the complete section and replace it with a new unit quickly. There are three models available, the first model contains the indicating instrument with the scale to indicate the tube thickness and this operates on the system of an alarm being sounded if the tube varies from the

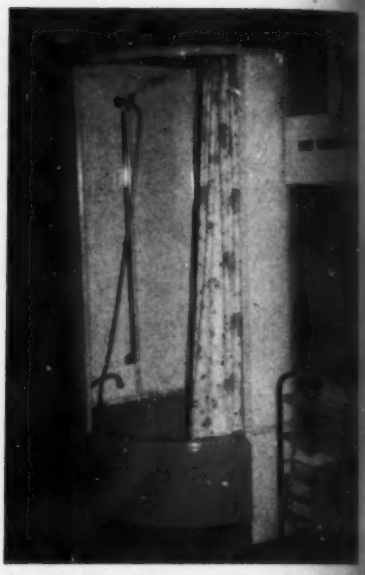

Fig. 9. The shower bath unit which attracted much interest

pre-set tolerance. This model costs approximately £585 ex-works. The second model is basically the same except that it has additionally a chart recorder which produces a record of the tolerance throughout a complete extrusion and allows long term controls to be set up on the

Fig. 10. The frames of these windows are made from rigid extruded PVC sections. A PVC strip is used to cover the putty retaining the glass

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quality of extrusion from each machine. This model costs approximately £670 ex-works. The third model is the same as model two but the monitor is linked to the haul-off equipment thus automating the extrusion line. In this case it is necessary that the haul-off drive should be electronically controlled. The result of this is that if any variation in tolerance takes place the apparatus

Fig. 11. Plastics from head to toe

automatically increases or decreases the speed of the traction unit in order to correct the tube thickness and bring it back to the pre-set figure. This model costs approximately £755 ex-works. Additionally various sizes of detector head are required according to the diameter of tube extruded, the price of these detector heads varies between £50 and £90 according to size.

On the manufactured product side of the exhibition the domestic complete shower bath attracted a great deal of attention from many visitors; this shower (Fig. 9) was of excellent construction and made entirely from plastics, the walls being of rigid PVC and the base of polymethacrylate. These showers are available in Germany either with or without a built-in water heating unit and cost approximately between £46 and £60. The whole unit is designed to fit into a corner and must be of particular interest to those concerned with fitting out small flats or houses.

Great interest was shown in the PVC window frames produced by Kühn and Rüger. The complete frame is made entirely from PVC, rigid section extruded, with the exception of the handles and hinges (Fig. 10). The glass is fitted in first and then puttied afterwards and covered by an outer PVC strip which is screwed into position, thereby giving a very effective seal of the window frame. Many visitors were continuously at the stand and it is obvious that if these are technically a good proposition there will be a very wide market for this product. However, to those interested in this particular product it may well be worth comparing this type of rigid plastic window frame with the British designed equivalent which was described in the October 17 1959 issue of *RJIP*, and which technically appears to be a much better proposition than the one illustrated.

What can be achieved in the fashion field in plastics is shown in Fig. 11. As a matter of semi-technical interest readers may like to know that this charming young girl is dressed from head to toe in plastics, but it was not possible to determine which plastics were used where.

A further report on the exhibition will be given in next week's issue.

Shell Synthetic Rubber

WHAT was described as 'an informal talk on the Role of Styrene Butadiene Rubbers in Industry,' was given by Mr J. B. Larkin, M.S., to an invited audience at the Criterion Restaurant, London, W.1, on the evening of October 13. The meeting was organized by the Southern Sales Region of Shell Chemical Co. Ltd., and proceedings were conducted by Mr J. A. Minch, B.Sc., Plastics and Rubber Sales Manager. Also present were Mr L. G. J. Engle, Regional Manager, Mr E. J. Jacobs, General Chemicals Sales Manager, and Mr P. W. Jacob, who is directly concerned with the selling of the Shell 'Cariflex' rubbers.

In opening the proceedings, Mr Minch said that Shell had only been offering rubbers in this country during the last six months and that these at present were coming from a totally integrated plant in the USA. However, by the middle of next year a plant should be in operation at Pernis in Holland having a capacity of about 50,000 tons SB rubber per year, and Shell also had an interest in a plant at Berre in France.

Recently, Shell in the USA have started to produce cis polyisoprene on a limited scale. In the UK Shell are staging a major entry into the plastics field and obviously consideration is being given to the possibility of a synthetic rubber plant.

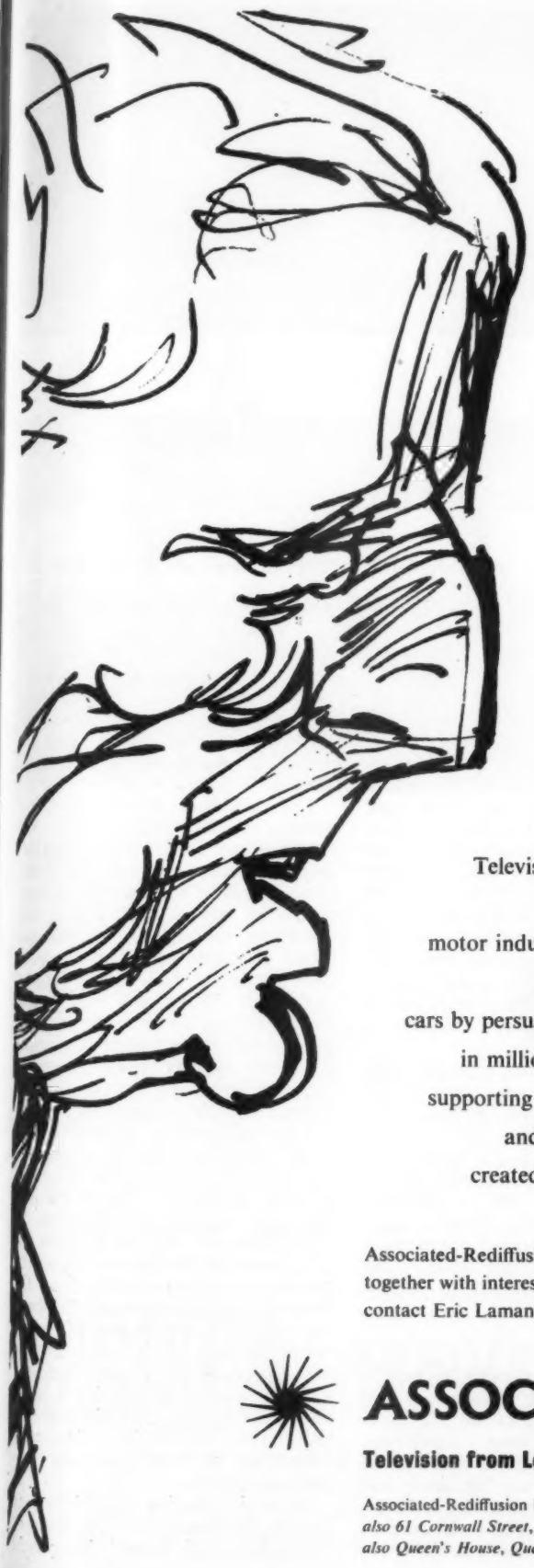
Mr Minch told his audience that Mr Larkin was a Master of Science of the University of Southern California who had joined Shell in California in 1955 but since 1958 had been working in Holland.

Mr Larkin began by comparing the ratio of synthetic to natural rubber which was used in different countries. In USA, synthetic usage was 64.6%, in Canada 58%, France 32%, Denmark 13%, and in the UK 28% of the total.

The speaker emphasized that although in the past economic considerations may have been responsible for the small use of synthetics in Europe, it was now necessary to look more at the technical considerations. Here, SBR had many advantages. It was important to realize that it was different from the SBR which was made about 1945. Cold polymerization was probably the main advance and better HAF black and silica fillers had been developed. SBR must therefore no longer be considered as a substitute for natural rubber but as a material having its own merits. These included superior resistance to abrasion, flex cracking and ageing. There was no difficulty now with processing, in fact SBR had some advantages, for example, a typical 1-ton mix took 30 minutes to make in an internal mixer using natural rubber and only 20 minutes with SBR which also had the advantage of a stable plasticity. The scorching tendency was less than with natural rubber. A further very great advantage was that of price stability, the cost hardly changed even though the price of natural rubber fluctuated violently.

Mr Larkin showed a series of graphs illustrating the relative amounts of natural and synthetic used in different branches of the rubber industry in the UK and these were also discussed and commented upon by members of the audience.

Mr J. A. Harley, 47, has been appointed deputy managing director of Steele and Cowlishaw Ltd., of Hanley, Stoke-on-Trent, one of the companies in the Baker Perkins group.



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On the platform at the opening of the conference were, *left to right*, F. I. Tuckwell, Sir Thomas Williamson, R. W. Lunn, G. E. Beharrell, the Rt. Hon. E. R. G. Heath, T. W. McCullough, Sir George Pollock and R. Davis

Safety in the Rubber Industry

FOURTH NATIONAL CONFERENCE

THE fourth National Safety Conference, organized by the National Joint Industrial Council for the Rubber Industry, was held in London on November 17 and 18 at the Royal Commonwealth Society's rooms. The proceedings were formally opened by Mr E. R. G. Heath, Minister of Labour and National Service. The first day's proceedings were followed by a dinner attended by more than 270 people at the Charing Cross Hotel, London. The conference was held under the chairmanship of Mr R. W. Lunn, chairman of the Leyland and Birmingham Rubber Co. Ltd.

At the dinner which followed on the evening of the first day of the conference, Mr R. W. Lunn said that for the last four years they had held the accident frequency rate steady but now they had lost 0.02 on their figures. He had greatly wanted to see the frequency rate go down. One-third of the rubber industry, he went on, had done brilliantly; their rate was down to about 0.5. There was another third that had done a conventional, efficient job, and had made progress. Then there was the other third—the failures. They were too shy, too reluctant to come forward and ask for advice or to admit failure. He used to feel very angry about that section of the industry. Now, he said, he did not feel so angry about them. They needed help but he did not know how they were going to get it. Part of the fault lay in the fact that the organization was anonymous. He thought it true to say that from 50,000 to 80,000 men in the rubber industry had benefited from the work of the NJIC, directly or indirectly. Concluding, Mr Lunn said that co-operation was absolutely essential. It should start with management and go right down to the man on the shop floor.

In his introduction to Mr G. E. Beharrell, the president, Mr R. W. Lunn said that there was a simple thought he would like to put forward concerning industrial relations, especially with reference to the period of 'wild cat' strikes through which the country was passing. They knew very well that for this state of affairs there was no simple remedy. It was a clear case of very poor industrial relations. It seemed to him, said Mr Lunn, that it was not possible to get first class human relations, that was to say first class industrial relations, without first class human beings. The problem of what kind of men were needed was a fundamental one.

If there were poor industrial relations, he went on, there was always great difficulty in making changes. In their work of industrial safety, on the other hand, they had a background where there was little chance of controversy. There was a common ground of agreement. It was a function of industry carried out perhaps more easily than any other. Mr Lunn then introduced Mr G. E. Beharrell.

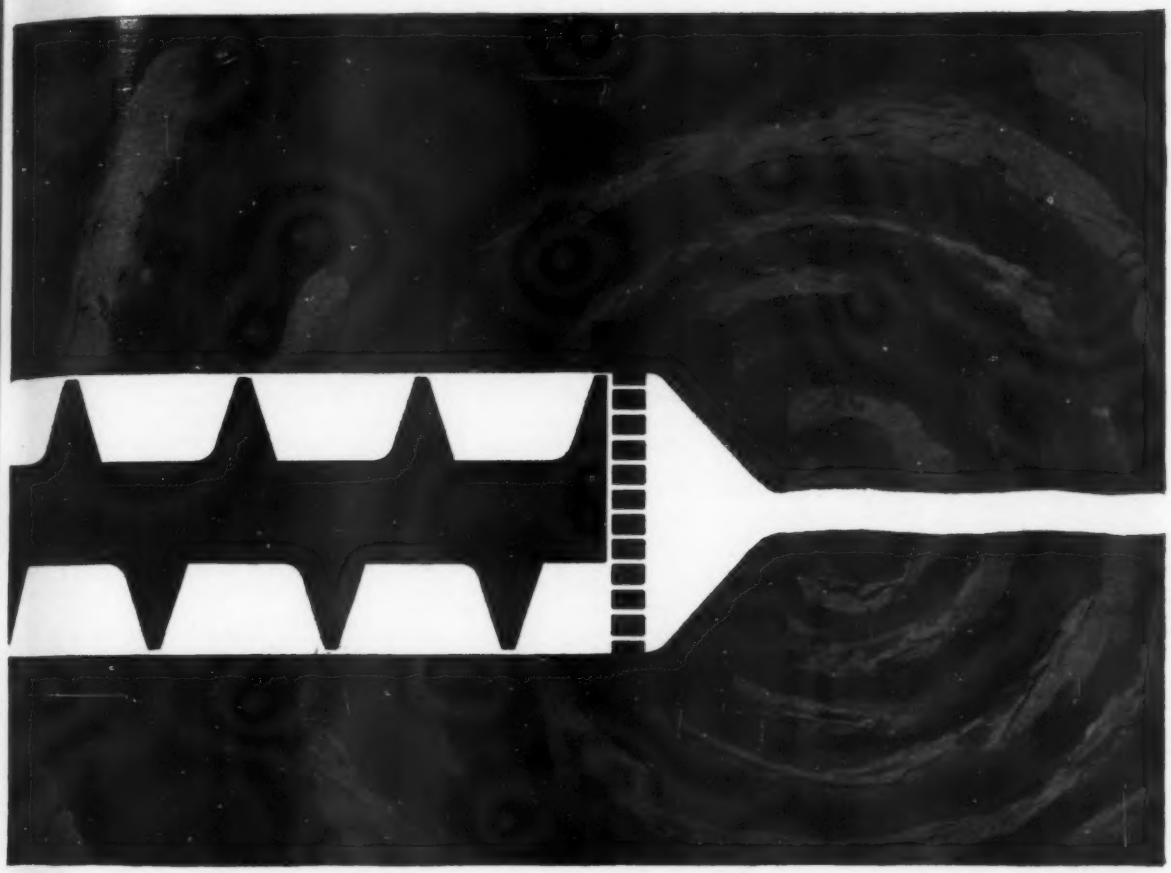
G. E. Beharrell

It was a great pleasure to preside once again at such an occasion, said Mr Beharrell, and to see Mr Lunn once more at the helm. There was, however, a sad note in the absence of Mr J. Stopforth. His death had been a grievous loss to the industry, for his contribution to their work on safety had been incalculable. Mr Beharrell went on to say how delighted he was to welcome Mr E. R. G. Heath, Minister of Labour, Sir Thomas Williamson, general secretary of the National Union of General and Municipal Workers, Sir George Pollock, director of the British Employers' Confederation, and Mr T. W. McCullough, H.M. Chief Inspector of Factories, to the conference.

The Accident Prevention Committee of the NJIC, said Mr Beharrell, had worked hard during the year on research into technical problems. Much of their work had concerned the two-roll mill, and in this respect he was happy to say that the fitting of safety bars had increased and accidents had been largely eliminated. When they had started their attack on the safety figures that then existed, the president continued, they had quickly made progress. Rapid improvement, however, always resulted in making increasingly difficult the achievement of further progress. Since that time, the committee had devoted much time to non-technical accidents. The result had been more intensive co-operation.

Mr Beharrell went on to liken the achievement of the industry in safety matters to the four-minute mile. Dr Roger Bannister had proved that there was a mythical barrier. In their safety campaign, their barrier had been the 1.0 frequency rate (one lost-time accident in 100,000 working hours). Yet, in 1958, 44% of their members had cracked that barrier. Now, they were faced with another vast programme of work.

Before introducing the Minister of Labour, Mr Beharrell said that one of the earliest of Mr Heath's jobs would



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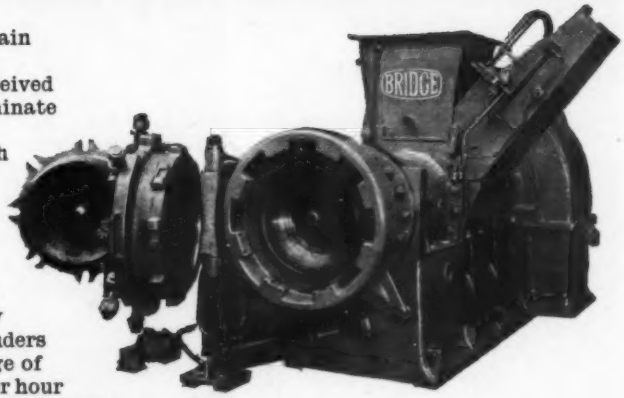

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be to implement the Factories Act, 1959, among which there were sections dealing with independent research into industrial safety, employment and welfare.

E. R. G. Heath

Mr Heath said that the conference was the first of its kind he had been invited to open since he became Minister of Labour.

After explaining in detail the official responsibilities which he had for industrial welfare and the reduction of accidents, Mr Heath said he attached much importance to the rubber industry where much had been done to raise the standards of health and safety. Other industries could well profit by studying the ways in which the rubber industry had set about the problem. A lack of adequate fencing and protection on callenders, extruders and two-roll mills was the exception rather than the rule these days. An important factor was a high level of co-operation between employers and employees. Not only should attention be paid to statutory regulations regarding safety, but all concerned in the industry should combine to make and keep their own local rules.

In a reference to the Factories Act 1959, Mr Heath said he had decided to implement some of the provisions on December 1 this year; the majority of those remaining would be put into effect on February 1 1960. The new Act had been passed with strong support from both sides of the House of Commons and one of its main provisions had concerned fire precautions. There were some 7,000 reportable outbreaks of fire in industry a year and there was much scope for improvement. Methods of firefighting and the provision of adequate means of escape were important factors.

In conclusion, the Minister said that it was his department's duty to help industry with its problems and he hoped they would not hesitate to seek advice when it was needed. He paid tribute to the Factory Inspectorate whose work had helped considerably.

This was the first NJIC conference that he had addressed, said Mr McCullough, but he had always followed the work of the Accident Prevention Committee with interest. He referred in detail to the No. 1 Mill Committee Report and said that progress in the conversion of two-roll mills had been considerable. Two years ago a safe mill had been a novelty. Proof of the effectiveness of the system employed, said Mr McCullough, was the fact that the United States rubber industry, which had originally showed little interest in UK methods, had now begun to study the system. An important aspect of two-roll mill safety was the introduction of the disc brake. They must press on until every mill in industry was brought up to date and safe. The running nip problem was also one which deserved continued close attention, and the incidence of non-technical accidents—165,000 were reported to the Factories Inspectorate in 1958—concerned him. Carelessness was the main reason. People were too inclined to leave things around and the result was that many accidents were caused by falls. The answer was a sense of tidiness, and the wearing of protective clothing. Many people did themselves injury through trying to lift weights that were too heavy for them, and through lifting them in the wrong way.

The key to all these problems was co-operation between all levels of industry. Admonition was not enough; those who worked in factories were absolutely normal people with normal reactions. They would be ready to do what was required of them if the reason could be explained.

Question Time

Sir George Pollock introduced the panel which consisted of Sir Thomas Williamson, Mr R. W. Lunn and Mr T. W. McCullough.

The first questioner said that his company had been troubled with the lack of safety provision on Continental machinery, some of which they had imported. What were the statutory requirements concerning imported machinery? In reply, Mr McCullough said that the UK law asked that foreign machinery should be adequately fenced and that all gear wheels should be guarded. In other respects the law was limited in what it asked the importer to do.

The next questioner asked what a safety officer should do if he found that an operative did not co-operate. Should he be taken off the job? Sir Thomas Williamson suggested that the first thing to do would be to have a good talk with the man; if this failed he should be moved to another part of the factory. Mr Lunn said that in his experience other operatives normally made sure that individuals toed the line. The workers

Amongst those present at the safety conference were: 1, Sir Thomas Williamson and R. W. Lunn. 2, G. E. Beharrell and Sir George Pollock. 3, H. Shorrock (Leyland and Birmingham), L. Hodges (Mitcham Rubber), and J. P. Francis and M. Brady (both of Leyland and Birmingham). 4, W. Coleman, H. Humpherson and T. Spurrier (all of Dunlop). 5, T. Skidmore, W. Donigan and A. Lyon (all of USDAW). 6, S. F. Smith (Dunlop), P. K. Brewin (BTR) and F. I. Tuckwell (Dunlop). 7, L. S. Bishop (Regent Tyre), J. Brown (Regent Tyre) and A. Babbage (RMEA). 8, J. O. Peacock and R. Hillier (both of the Factory Inspectorate). 9, E. Harrington (Redferns), F. M. Panzetta (Spencer Moulton) and H. Uttley (RMEA). 10, R. Barnes (Leyland and Birmingham) and A. Babbage (RMEA). 11, R. Saunders (Expanded Rubber) and S. G. R. Hart (Northern Rubber). 12, R. E. Fricke and W. Melville (both of Goodyear). 13, P. Whitaker (Francis Shaw) and E. A. Helps (Avon). 14, J. Kiely and J. Beston (both of Firestone). 15, S. Taylor (Dunlop), J. L. Hunter (P. B. Cow) and D. Robson (Dunlop). 16, T. McDonald (TGWU), H. Vale and G. H. Perkins (both of Dunlop). 17, F. Davis and S. Riding (both of BTR). 18, M. Wright (Semtex), R. Davis (TGWU) and R. W. Lunn (Leyland and Birmingham). 19, W. H. Gregson (BTR), A. Babbage, Dr W. D. Scott (BTR) and A. Zancan (Pirelli). 20, H. Jackson (Leyland and Birmingham), R. V. Clegg (David Moseley) and D. P. G. Moseley (David Moseley). 21, S. Pemberton (Dunlop) and T. McDonald (TGWU). 22, T. Davies, C. Baker, A. Peach, S. Harrison (all of Firestone). 23, H. Eccles and H. Woods (both of the Factory Inspectorate)

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themselves usually made sure that standards were maintained.

In answer to the question: 'Why, if it is the law, are not all mills converted to safety in this country?' Mr McCullough said that they were trying to convince employers of their obligations but it would clearly be impossible, and unwise, to prosecute everybody.

Much discussion was aroused when one of the delegates asked whether a man of over 40 who had been lifting weights by the wrong method for a period of years, should be trained to handle materials by modern methods. The questioner said that he himself had been lifting weights for some years and, although according to the experts his method was wrong, he thought his body had adapted itself. When he had attended a safety course and had been advised to change his ways, he had found the new method most difficult and had suffered considerable physical pain. Mr Lunn said that the human spinal column was not a jib to be used for lifting, it was flexible. In his opinion it was no use pretending that because a man of 40 had had no injury that he would never have any in his life.

Responsibility of Management

The first paper to be delivered at the conference was on 'The Responsibility of Management for the Prevention of Industrial Accidents.' The speaker was Mr W. M. Larke, general manager, Stewarts and Lloyds Ltd., and Deputy Chairman of the Accident Prevention Committee of the British Iron and Steel Federation. The theme of his speech, said Mr Larke, was that they should all create and foster the growth of the right attitude of mind which made up a safety conscious individual. Management could not merely say do this—do that. They must make an example. They should ensure that the correct steps were taken in the design of plant and buildings, a very important consideration, and they should plan operations carefully with an eye to safety. Management must recognize the problems and hazards, and industry must function despite its problems. It was essential that people should only be asked to do things within their own capability and this could be achieved with the aid of selective training and education.

Mr Larke emphasized that these points applied to small as well as large firms and he said that even in a small firm, at least one member of the management should take a close interest in safety. To illustrate his point about selection and training, the speaker gave the example of a crane driver in the steel industry, and he thought that it would apply to all industries. The skill required to drive a crane was little, but because of the potential danger in an irresponsibly-driven crane, drivers had a severe medical examination and did a course of intensive practical training. All men should be convinced that it was in their own and everybody else's interests to be safety conscious. An instinct must be created.

Referring to management's responsibility for setting an example, Mr Larke quoted the proverb: 'Justice must not only be done, it must also be seen to be done,' in this case it should go: 'Management must not only be interested, it must also be seen to be interested.' He thought it essential in most instances that safety officers should have no executive responsibility, they should act in a purely advisory capacity.

On chain of command, Mr Larke said he thought the people at the bottom ought always to be able to see the people at the top. He recommended a study of ergonomics by management.

Accidents should always be reported fully. It was essential, if the true reason for an accident was to be found, that none of the details leading up to it or pertaining to it should be omitted from reports. Managements generally were too lax on this point. Statistics should be kept and should be presented in such a way that they could be understood by everybody. The significance of fluctuations should be impressed on employees.

Illustrating the necessity of giving full details when submitting a report on an accident, Mr Larke said that if a man who had only one eye sustained an accident at a machine, and his foreman failed to include details of the eye in his report to the safety officer, research into the reasons for the accident could be completely misguided, whereas the absence of sight in one eye could immediately indicate where the trouble lay.

Accident prevention committees should be powerful and effective and informal discussions at a relatively low level should be encouraged. Committees should meet at least once a month and suggestions from employees should always be looked into.

On the subject of notices in a works, Mr Larke said it was useless to put up a sign saying 'Do not pass this point!' No employee would be impressed. The notice should read, for example, 'Do not pass this point. Poisonous gas!' People then knew what was meant. Visitors to a works—outside contractors and delivery drivers, etc.—should always be warned about the statutory regulations applying and the works' own domestic regulations.

Summing-up, the speaker said that if they all adhered to the principles he had outlined in his talk, he was sure that a greater measure of safety would be achieved.

Discussion

In the course of discussion, the question of whether job evaluation in accident prevention was valuable was raised. Mr Larke said that it was undoubtedly valuable, particularly where a job was repetitive. But it was impossible to generalize.

Questioned about the function and constitution of accident prevention committees in his own works, Mr Larke said that there were four main types in existence—two concerned with production, one with engineering and one with electrical problems. Each committee considered safety matters in its own sphere, and they all worked together.

The question of the value of posters aroused much discussion. Mr Larke said that the value of posters was completely unknown but there were many ideas on the subject. As far as he knew no one had ever unearthed any reliable and conclusive evidence to prove that posters were effective. One delegate took exception to this and said that posters were a necessary part of accident prevention. They were a good means of communication and he thought that any means of communicating with employees was valuable. A well designed poster appealed to emotion.

Mr R. W. Lunn, called upon to give his opinion, said that he agreed largely with Mr Larke. No proof had ever been presented that posters were of value. He, in fact, thought they were nonsense. The only means of communicating with employees was through personal leadership. Men would follow a leader and would be far more impressed with the sound of the human voice than by a poster, however well designed.

BICC Takeover

British Insulated Callender's Cables is to absorb the Metropolitan Electric Cable and Construction Co. Production is to be transferred progressively to BICC's Erith, Kent, works, starting from January 1 1960.

Earlier this year, BICC took over the Telegraph Construction and Maintenance Company and Scottish Cables Ltd.

FURNACE

VULCAN 9 SAF
VULCAN 6 ISAF
VULCAN 3 HAF
VULCAN C CF
VULCAN SC SCF
VULCAN XXX SCF
VULCAN XC-72 ECF
STERLING SO FEF
STERLING S, PELLETEX } SRF
STERLING NS, PELLETEX NS } SRF-NS
STERLING L, STERLING LL } HMF
STERLING V GPF
STERLING 99 FF

CHANNEL

SPHERON 6 MPC
SPHERON 9 EPC
SPHERON C CC

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VIEWS and REVIEWS

Cure Lag of Laboratory Specimens

'SINCE modern accelerators give relatively fast cure to rubber compounds, it becomes increasingly important to evaluate properly the cure of laboratory specimens for which the test results will be sensitive to the rate of cure. In platen press curing, as the rubber pieces and moulds become thicker, cure lag becomes greater. . . .

'There has been some question as to whether the rubber compounder actually gets the exact cure he specifies for tensile sheets. There is a period of press opening, loading the sheet with the mould out of press, and press closing which must be taken into consideration. . . .'

The foregoing is part of the introductory passage of 'Cure Lag in the Curing of Laboratory Test Specimens' by H. A. Freeman and S. D. Gehman (Goodyear, Akron) which will explain the object of the paper appearing in *Rubber Age* (Vol. 86, *No. I*, p. 86, 1959) for October.

I will not repeat the experimental conditions employed as they are too elaborate for review but must confine myself to recording the results.

Results

These were as follows:

1. There is no cure lag in platen press sheet curing of 0.075in. thickness, under proper curing conditions.
2. Cure lag becomes a factor and is greater as the mould and specimen increase in thickness.
3. A thermocouple study under given conditions takes into consideration all factors influencing the actual heat flow. It is difficult to include all factors with a mathematical calculation.

Butyl Rubber Latex

'Butyl Rubber Latex: Its Uses in Non-Transport Conditions' is the title of a paper by A. L. Miller and K. W. Powers (Chemical Research, Esso), in *Rubber Age* (October 1959, p. 89).

MD-600-55 is an anionically emulsified latex of *Enjay Butyl 268* which makes butyl rubber available in a high solids true latex form for the first time. It is currently available in semi-commercial quantities with commercial production scheduled to start late this year. This latex can be handled using standard latex methods.

Summary

Preliminary studies on Butyl Latex MD-600-55 have indicated it to be a very stable latex with unusual tolerance for pigments and ionic materials which would normally cause coagulation with other commercial latices. This stability limits the usefulness of MD-600-55 latex to fields where ability to cause controlled coagulation with it is not essential. Viscosity of the latex can be controlled with conventional thickeners and also through the addition of salt solutions. Deposited films can be cured at fairly low temperatures (210°F.) in highly accelerated systems to give interesting physical properties.

Vulcanized butyl films are very resistant to ageing and show less gas permeability. In addition, butyl latex films supported or deposited on various substrates, have desirable 'hand' and 'drape' which should be of interest for many household and apparel applications involving dipped goods and possibly non-woven fabrics. Paper coatings, barriers and adhesives are other areas where the latex has shown some promise, while many other uses have yet to be investigated.

Stimulation of Tree Yield

In the *Planters' Bulletin* for November, pp. 59 to 142, there is a notable article, the title of which is 'Stimulation of the Yield of Rubber Trees as a *Routine Estate Practice*,' which seems to be important. (*The italics are the reviewer's.*)

The introductory passage is as follows:

'Field experiments on the use of synthetic growth substances to stimulate yields have been in progress from 1951 onwards; the results obtained now enable us to give recommendations for the use of these substances in *routine estate practice* (the italics are the reviewer's). The properties of the available substances, methods of applying them, and the response of yields to stimulation under varying circumstances, are discussed below. Finally, a suggested schedule is given for tapping and stimulation of buddings and seedlings grown under normal management.'

The article is signed *Botanical Division*, and it may be recalled that the *Planters' Bulletin* is issued by the *Rubber Research Institute of Malaya.*

Stimulants

There are at present four proprietary yield stimulants available in Malaya, and their properties are given under the 'Properties of Available Stimulants.' These are as follows:

	Trade name	*Active ingredient*	*Sold by*
1.	Flomore	2, 4, 5-T	I.C.I. (M) Ltd.
2.	Star Brand	2, 4, 5-T	Malayan Fertilisers Ltd.
3.	Stimulex	2, 4-D	Guthrie & Co. (M) Ltd.
4.	Ready Rub	2, 4, 5-T	Rotterdam Trading Co. (M) Ltd.

Flomore and Star Brand stimulants are formulations of similar compositions, containing 1% 2,4,5-T, and prepared according to RRI recommendations. They have a greasy appearance, and are for application to scraped bark below the tapping cut. They are unsuitable for monthly or bimonthly application above the cut, if users attach any importance to the quality of the renewing bark for future tapping.

Stimulex is a fluid formulation containing 2,4-D in a mixture of vegetable oils. Its stimulating effect is of the same order as that of the 2,4,5-T stimulations but it is less injurious to the bark tissue. *Stimulex* may be applied to tapped bark above the cut at monthly or bimonthly intervals, but overlapping of the areas of bark treated with stimulant must be avoided.

COMMENT ON SCIENTIFIC AND INDUSTRIAL MATTERS

by **DR SCHIDROWITZ**

Like the 2,4,5-T stimulants, *Stimulex* has to be applied to scraped bark if applied below a downward cut. This stimulant needs stirring before use.

Ready Rub contains 2,4,5-T. It is intended to be applied to unscraped bark above the cut.

Results at present available suggest that *Ready Rub* is less effective than any of the other stimulants on renewed bark; satisfactory results have been recorded from application to virgin bark during ladder tapping. *Ready Rub* should be stirred before use.

Some Results

I cannot review these matters as a botanist, and hope that a more competent pen than mine will deal with this matter from the botanical aspect. Meanwhile, I give, with all reserve, some of the results obtained. Under the heading 'Yield Increases: Reactions of Different Planting Materials to Stimulants.' We have the following remarks, with the limiting prospects as follows:

'In general no predictions can be made as to increase in yield . . . much depends on the health of the trees. . . . Trees growing under poor environmental conditions do not respond satisfactorily, and it is often from such material that an increased output is desired. . . . Poorly renewed bark of healthy trees also gives a disappointing response. The best results are obtained from well renewed bark, or from virgin bark at high level on trees which are in good heart.'

Clonal Seedlings

'On clonal seedling trees 20 years old at the time of their first treatment, we have recorded over a period of seven years a total increased yield of 36.5%. . . . The control trees were yielding at the rate of 876lb. per acre per annum, which means that a yearly increase of some 320lb. per acre was obtained at a total cost in stimulant . . . of less than $12(M.) per acre per year.'

Unselected Seedlings

'Unselected seedling trees tapped on high panels in virgin bark gave a similar relative response, but as their actual yield level rarely exceeds 500lb. per acre, the quantity of rubber obtained through stimulation is less than for clonal seedling trees.'

Buddings

'In general buddings react favourably to stimulation if tapping is done on high panels or on bark of good renewal. We have recorded an increased yield of 300lb. per acre per year over a period of five years in an experiment on mixed buddings, planted as budded stumps in 1930. . . . Clone AVROS 50 was the only clone that showed a disappointing result to stimulation under the conditions of this experiment. The evidence is generally not sufficient to demonstrate significant differences between clones in their response to stimulant application.'

The above is a mere outline. There is much more on different clones, on the Effect of Tapping System on the Response to Stimulation, on the Effect of Environment, on Brown Bast, on Rate of Flow, on Precoagulation, on DRC, on Properties of Latex, etc. My impression is that the results are such as to warrant the continuation of the experiments on the lines mentioned in the beginning: 'The results obtained now enable us to give recommendations on the use of these substances in routine estate practice.' It is plain that under present conditions the use of these stimulants is not advisable; under others, their application is likely to be successful.

NR for High Temperature Service

Natural rubber compounds have recently been developed which give an improved overall retention of properties during service at high temperatures. These compounds, based on a sulphurless tetramethylthiuram disulphide (TMT) vulcanizing system, are not necessarily the best for specific ageing conditions encountered in certain applications, and attention has therefore been given to devising modified formulas to meet these requirements.

Two such modifications relate to improved NR compounds for steam hose and formulas giving substantial freedom from the 'bloom' which characterize TMT vulcanizates. In the first of these where rubber is exposed at elevated temperature, in a mainly oxygen-free atmosphere, the use of a dicumyl peroxide curing system is recommended. In the second, mixtures of high molecular weight of thiuram disulphides with the tetramethyl derivative are effective, and the much slower action of such mixtures has been overcome by applying the use of thiourea as an accelerator, rapid curing then being possible at as low as 70°C.

SP 90

It is held that the production in lower grades is necessary if full use is to be made of this development, and the RRIM has recently brought processes of SP brown crepe to the commercial stage. A concentrated form of SP rubber—*SP 90*—which can be blended in small proportions with ordinary rubber in the factory to obtain processing advantages, has also been produced 'and promises to be well received.' These developments have called for a considerable programme of technological evaluation, which has been undertaken jointly with the RRIM.

Superior Processing Rubber: BRPRA Technical Bulletin No. 2, with additional Information Sheets A and B. Do. do. *H. C. Baker, Trans. IRI*, 1956, *32*, 77.

RTD Activities

Rubber Bonded Non-Woven Plastics

A major alteration to the pilot plant for the production of non-woven fabrics has been the substitution of the spray latex impregnation by a bath impregnator unit designed by the engineering section of the BRPRA. This has proved very satisfactory, and non-woven fabrics as low in weight as 1oz. per sq. yd. can be made. Sets of fabrics prepared using this bath were displayed at the International Textile Machinery Exhibition in Manchester in October 1958, and an impregnator based on the RTD model was exhibited on an exhibition stand.

Non-woven fabrics with improved high temperature resistance can be obtained by using sulphurless thiuram accelerated or low sulphur-tellurium systems. These fabrics withstand the comparatively short periods at high temperatures required for these coatings. The first system also gives greater resistance to dry cleaning and detergent solutions.

PHILIP SCHIDROWITZ

Questions Corner—93

(Second Series)

391. What types of pigments and extenders can be recommended for use with polyester resins?

392. Urea-formaldehyde resins are used for wet strengthening paper. Give some details.

393. Can welding by friction be used for bonding thermoplastic materials?

394. Give some details regarding methods for welding piping and tubing.

(Answers next week)

Answers to Questions Corner—92

387. A useful test for determining the urea-formaldehyde resin used for wet strengthening paper if properly cured is by heating a sample of the resin treated paper in an oven for 10 minutes at 127°C.

The wet strength after this treatment is then compared with that of a duplicate sample taken from the machine at the same time.

Curing may take place at room temperature but takes several days, or even weeks, to reach optimum. It may, therefore, be expected that the degree of wet strength determined in the heat cured sample is unlikely to be reached in a paper which has to rely on the final stages of curing to take place at room temperatures.

However, the difference in wet strength between the original and the heat cured sample will serve as a guide in determining the gain in wet strength on standing.

It facilitates curing of the resin if the cooling water is cut off when making, and reeling the paper while hot, and then allowing it to cool overnight in the reel.

388. Melamines are used in combination with alkyd resins to improve the hardness and alkali resistance of finishes that are cured rapidly at low temperatures. They are also being used to obtain comparable advantages with epoxy resins.

Formulation of lacquers from such resin combinations must be made with care as the tolerance of the resins for various solvents is not indicative of their stability on storage.

The reactivity of alkyd resins with melamines is dependent on the free hydroxyl and carboxyl groups in the former. Etherification takes place and is promoted by the acidity of the carboxyl groups.

With short-oil alkyd resins it is necessary to use a sufficient quantity of primary alcohol to ensure storage stability. With long-oil alkyds their reactivity is less and it is possible to use less primary alcohol.

With epoxy resins and their fatty acid esters of low acidity it is possible to use solvent mixtures not containing primary alcohols and still obtain good storage stability when using melamine resins. If acid catalysts are used it may be necessary to include some primary alcohol to obtain reasonable storage stability.

The compatibility of melamine resins with solvent type plasticizers is limited because, in general, they do not react with the melamine on stoving and have a tendency to sweat out. Blown castor oil will react with melamines during cure.

389. Urethane foams, whether flexible or rigid, are generally prepared from polyesters, diisocyanates and water.

Mechanical characteristics of the foam depend largely on the choice of polyester. By varying the degree of branching either flexible or rigid foams can be prepared.

The diisocyanate reacts with the polyester converting it into a high molecular weight plastic. At the same time the diisocyanate reacts with water to generate carbon dioxide which foams the resin. The density of the foam is controlled by the amount of water and the corresponding amount of water used.

In addition to these main ingredients, other agents such as catalysts and emulsifiers may be added to control the rate of foaming and the cell structure.

The liquid mixture is poured into the mould or cavity to be filled and foaming proceeds without the use of heat or pressure. The foaming recipe must be carefully controlled so that the gas is evolved at a suitable rate before gelation occurs. Lighter foams require more diisocyanate than denser foams.

Two component systems are available for hand mixing but commercial production involves the simultaneous machine mixing of all the ingredients immediately before foaming. One of the outstanding developments has been the design of suitable machinery for the continuous production of foam.

390. Hot-gas welding is one method whereby two or more components of the same material can be joined so that the sections of the material are joined with a bond strength almost equal to that of the parent material.

In this method, the thermoplastic sheets to be joined are suitably bevelled and cleaned, and a welding rod of the same material is used. The rod and weld bed are simultaneously heated by a hot-gas stream issuing from a welding gun. As the two mating surfaces soften they are forced together to form a homogeneous bond.

Welding guns may be heated by gas or electricity. The former is more convenient where electrical supplies are not readily available, but the latter is generally used. Whatever type of gun that is used it should be capable of giving, at the orifice, a temperature between 200°C. and 300°C., at a rate of 0.5 to 3.0 cubic feet per minute.

The temperature at the orifice can be controlled by varying the gas pressure and flow rate. The pressure varying from about 5 psi to 15 psi, and the flow rate about 1.5 cubic feet per minute.

The distance between the tip of the gun and the weld is very important as a large temperature drop occurs over a very short distance.

When welding polythene, and other plastics, which are sensitive to oxygen, nitrogen is used. With PVC compressed air gives good results.

(More questions next week)

Rubber for Rice

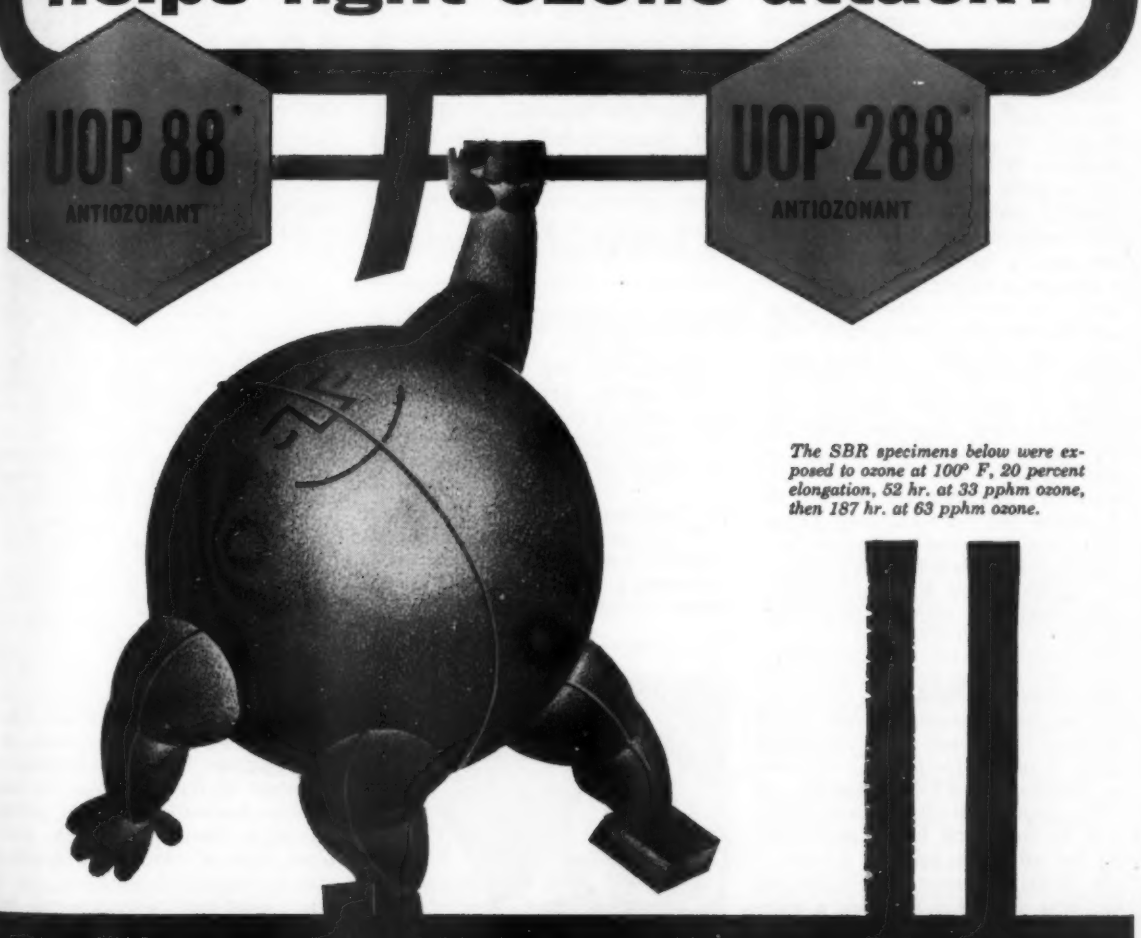
Ceylon and China have opened talks in Peking to determine quantities and prices of rubber and rice to be exchanged between them under a barter deal next year.

According to Food Ministry sources in Colombo, Ceylon will buy about 200,000 tons of rice from China next year if the price is satisfactory. Under the current year's agreement, Ceylon delivers 30,000 tons of rubber to China in exchange for 230,000 tons for rice.

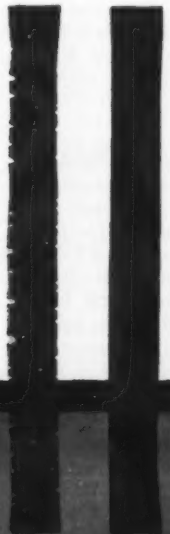
Polly Ester Says . . .

'Arc resistance—what you get when you wear ear plugs'

what type of CARBON BLACK helps fight ozone attack?



The SBR specimens below were exposed to ozone at 100° F, 20 percent elongation, 52 hr. at 33 pphm ozone, then 187 hr. at 63 pphm ozone.



the kind you choose can be a help or a hindrance . . .

Are you aware of the extent to which some carbon blacks adversely affect the protection afforded rubber products by antiozonants?

Some inactivate much of the antiozonant added for ozone protection. Others are more compatible with the antiozonant.

The two rubber test strips shown at right are clear evidence that carbon black plays an extremely important part in obtaining maximum service life of rubber compounded with antiozonants.

In formulating rubber compounds which must have high resistance to ozone, look to Universal for assistance. Special facilities and technical personnel are available to serve you. Write or telephone our Products Department.

(Left) Carbon black—EPC (easy processing channel). Curing system—2 phr sulfur, 2 phr benzothiazyl disulfide. Hours to first crack—31 to 47.

(Right) Carbon black—HAF (high abrasion furnace). Curing system—2 phr sulfur, 2 phr benzothiazyl disulfide. No cracks in 239 hr.

UOP **UNIVERSAL OIL PRODUCTS COMPANY**
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MEN *and* MATTERS

A Review of People and Events

by George A. Greenwood

TWO or three weeks ago I had something to say about the work of the Noise Abatement Society, which has not only roped me in as a member but also the bulldog belonging to one of my friends, who is destined, I gather, to be the first chairman of the canine section if he will suppress barking! But, seriously, many of us know that dustbin lids can be a terrible source of annoyance and this again I have mentioned. Now, it appears, a rubber lid which will fit on to the top of a standard galvanized bin, has been produced to overcome the problem of noise associated with the usual metal lids. There are also rubber dustbins in at least three sizes. Separate rubber lids are now on the market to sell at approximately 22s. 6d. apiece. I hope they will solve the problem for those who feel that an all-rubber dustbin is too expensive for domestic use. One can also buy a flexible polythene lid produced to fit standard-sized metal bins at, I understand, 10s. 6d. each.

Man-Powered Flight

The many friends of Mr Henry Kremer, chairman and managing director of Microcell Ltd., and also a director of BTR Industries, of which group Microcell is a member, will be interested in the news that he has offered a prize of £5,000 to the Royal Aeronautical Society for the first successful flight of a man-powered aircraft, designed, built and flown within the British Commonwealth, under conditions to be laid down by the Society. These conditions will be announced shortly, and the Royal Aero Club will be invited by the president of the Society, Mr Peter G. Masefield, to act as official observer.

This prize is offered personally by Mr Kremer, and not by any of his companies. Mr Kremer, who is enthusiastic about the work of the Man-Powered Aircraft Group of the Society, thinks that this offer of his prize will provide the stimulus to achieve a successful first flight. The announcement of the offer came appropriately to the Society from Mr R. Graham, C.B.E., an executive director of Microcell Ltd., who is a Fellow of the Society, and a member of the committee of its Man-Powered Aircraft Group.

Mr Kremer, who has been on the production side of industry all his life, pioneered before the war, it will be recalled, the resin-bonded composition board industry. He formed Microcell Ltd. in 1950 and in January this year that company was merged with BTR Industries. He is a member of the BTR Industries board, and has continued as chairman and managing director of the Microcell Group, which has retained its identity as an operational group.

An Engagement

Warm congratulations will be extended to young Mr George Beharrell, bearer of a name so familiar in the rubber industry, whose engagement has just been announced to Miss Veronica Anstey. He is the only son of Mr and Mrs J. R. Beharrell, of Streetly, near Birmingham, and his bride-to-be is the only daughter of Mr and Mrs D. G. Anstey, of Edgbaston. He is also a grandson of the late Sir George Beharrell, president of the Dunlop Rubber Company for many years before his death, and a nephew of Mr George Beharrell, its present chairman.

Appropriately, the young couple met on the golf links about seven years ago when, in their earliest teens, they were being coached by Jack Cawsey, professional of the Pype Hayes Club. In 1956 Mr Beharrell became the youngest golfer to have won the British Amateur Championship—at 18. A year later he was named 'golfer of the year' by the Association of Golf Writers. He is associated with his father's family firm of export merchants, and only a few weeks ago returned after a seven weeks' business tour which took him to America and through the UK.

Mr K. Bradshaw, left, representing David Bridge & Co. Ltd., is here *(top)* **presenting the Bridge Trophy to Mr B. Fitton, the winner, at the recent Manchester IRI golf competition. In the lower picture Mr Bradshaw is himself receiving a prize from H. K. Mills, the captain**

More Profit-Sharing

Sir Alexander Fleck, F.R.S., who, as I have said before, succeeded the late Viscount Cecil of Chelwood as president of the Industrial Co-Partnership Association, will be retiring shortly as chairman of I.C.I., giving place there to Mr Paul Chambers, and it looks as though he is going to give a good part of what he may find to be his new leisure to promoting more schemes of profit-sharing as the road to co-partnership.

Addressing a gathering of the Association the other day, Sir Alexander was at pains to show that, contrary to a widespread view, the I.C.I. scheme has been a positive success in that far more employee-shareholders than had been imagined have retained their interest in the company. In the five years of its existence, he said, the average worker would have been given £100 worth of stock, valued at the time it was given by the company at £150. If he had retained that stock to the present day, it would be valued on the Stock Exchange at £275.

'About 60% of the stock that has been handed out has been retained so far in the hands of the original

recipients, so that there are a great number of workpeople today who are shareholders in I.C.I. because of the profit-sharing scheme,' Sir Alexander revealed.

A Take-over?

There are one or two items of industrial and personal significance to mention this week. One is the probable changeover in control of National Plastics Ltd., for which a bid by Courtaulds, said to amount to £550,000, has been made and which it seems very likely to be accepted. It has come through Group Developments Ltd., a Courtaulds subsidiary, formed, I gather, to handle its plastics and other similar interests. National Plastics has made immense strides in recent years, not least during the past three or four years, and the leadership of Mr A. A. Duncan. What people are now wondering is how it will operate in an eventual takeover—whether it will continue as a separate entity or it will be 'integrated' as they say. Courtaulds, by the way, will find no difficulty in implementing any such bargain as this, for it continues to report vastly higher profits—at £9,154,000—for the six months up to last September.

Some weeks ago I was writing about the long and distinguished services of Colonel E. G. Angus as managing director for the past 25 years of George Angus and Co. Ltd., so well known as users of rubber in their manufacturing enterprises. The board now announces that it is establishing an award to be known as the 'Graham Angus Travel Scholarship' to mark its appreciation of these services.

Mr Paul Chambers, chairman-shortly-to-be of I.C.I., in succession to Sir Alexander Fleck, is, I hear, to pay visits to its various branches and associates overseas before taking up duties. Accompanied by his wife, he went the other day on a ten-day visit to South Africa, where he will confer with the directors at the Cape.

Changes

Dr W. J. Bushell has been co-opted to the board of Cellon, and appointed its deputy chairman. This is a branch of Courtaulds, of which Dr Bushell is director and general manager in the chemicals division. Mr A. Wallace Barr becomes managing director of Cellon as from January 1.

Mr J. Christopher Ingram, after several years in rubber, has accepted an invitation to join the board of Redfern Holdings as from Tuesday next. He will also be assistant managing director of Redfern's Rubber Works. Mr M. H. N. Arnold has been appointed managing director of Bowman's Chemicals in place of Mr S. H. W. Pert, who has resigned from the board on reaching retiring age.

Almost Polly Ester

Father Christmas, officiating a little before the event, seems to have made a bloomer in staid Boreham Wood, Hertfordshire, where the local Scouts have had a Christmas Fair.

They ordered some ready wrapped gifts from a toy manufacturer for Santa Claus to hand out to the kids. No one checked their contents.

But what the children found were plastic cameras, each apparently containing a film strip of elegant nudes. The organizers apologized and offered to exchange the cameras for more suitable gifts. However, I gather that only about half the cameras have been returned.

Motor Speedways

The Michelin Tyre Co. Ltd. have pointed out that their 'X' tyres, correctly fitted and inflated, are suitable for sustained high speed up to the maximum capability of any car for which they are recommended. This applies even where cars are capable of 120 mph, and for journeys of 'motorway' length. This is quite a significant statement when it is remembered that 'X' tyres are made for normal day-to-day running on practically all modern cars from the small family saloon to the high-powered sports car.

A CONTINUOUS MIXING DEVICE Continued from page 672

Samples were taken at 6-minute intervals of sufficient size to cure a single tensile sheet which was tested for its stress-strain properties. The averages for the 41 samples and the widest extremes in values are given below:

Tensile strength, psi	Av. 3285	$^{+115}_{-185}$
Modulus at 300°, psi	Av. 1990	$^{+200}_{-390}$
Elongation, % ...	Av. 475	$^{+\ 70}_{-\ 45}$

It was not known for certain how much of the variation shown above was due to testing error and how much was due to variation in the samples. The stock from the entire run was blended and 41 samples taken at random and cured and tested with the following results:

Tensile strength, psi	Av. 3275	$^{+125}_{-275}$
Modulus at 300°, psi	Av. 1890	$^{+\ 60}_{-\ 90}$
Elongation, % ...	Av. 495	$^{+\ 25}_{-\ 25}$

These data show that the tensile strength values were remarkably uniform, but that the modulus and elongation values varied considerably more than the testing error. This is a reflection of the slight variations in the curing rate due to inaccurate metering of the curing agents for the reason given above.

Discussion

During the discussion, in reply to a question from Dr Stern, the speaker said that the Rotomill was not satisfactory for milling reclaim as the hard pellets were forced through without being broken down. On the other hand butyl rubber appeared to handle better on the machine than on the conventional mill. Under the same conditions, however, the Rotomill generally produced an equally satisfactory mix as the ordinary mill did.

Summary

The Rotomill is a simple device capable of mixing a wide variety of rubber compositions on a continuous basis. We believe that it is the first practical device for achieving this objective. The virtues of continuous operation are better control, greater uniformity, susceptibility to automation, and greater economy.

While large production units have not yet been built, there appear to be no insuperable obstacles to doing so.

LITERATURE

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Polythene Caps

A new department has been created at the Salford factory of Universal Metal Products Ltd., and part of the plant which was running hitherto at their Southport factory has been installed at Salford. The move has been made because of increased demand for polythene closures.

All polythene caps made at UMP and supplied by UMP are now destaticized in order to eliminate the tendency to attract dust particles from the air.

Plastics in Building

LONDON CONFERENCE

A CONFERENCE on the 'Influence of Plastics in Building,' organized by the Plastics Institute, was held at the Royal Institute of British Architects, London, on November 19 and 20. The conference, which was very well attended, attracted delegates from both the building and plastics industries. Chairmen at the three sessions were, respectively, H. F. Wilson, president of the Plastics Institute, L. M. Read, vice-chairman of Council, and G. Tolley, chairman of Council. The conference was opened by Jefferiss Mathews, of the RIBA, who designed the I.C.I. Technical Service Block at Welwyn.

In his opening address Mr Mathews said that the main problem which architects faced was the dissemination of materials. They wanted to know how to use new materials but it was essential that the industries concerned should advise on their use. The RIBA was starting to organize the circulation of data sheets on new materials to architects. Architects, said Mr Mathews, were notoriously cautious and conservative. They had to be convinced of the value of new materials. He urged the plastics industry to have really creative thoughts about the possibilities of their materials for building applications.

The first paper to be delivered at the conference, 'The Nature, Properties and Uses of Plastics Materials,' was given by C. W. Welch (editor of *Plastics*). The speaker examined the incidence of the use of plastics to show tentatively how certain industries had accepted plastics materials, evaluated specialized properties, and put them to work. He contrasted these industries with builders and architecture, where the rate of acceptance was considered to be much lower.

In considering the nature of plastics in this paper emphasis was placed on the source of these materials and their chemical structure in so far as this influenced their advantageous properties. Plastics were defined by main types, certain basic terms were explained, and an attempt was also made to outline the structure of the plastics industry in relation to other important industries. The growth rate of the plastics industry was discussed.

The speaker analysed plastics materials by properties, within the context of the likely demands of the building industry, and attention was given to strength characteristics, weathering, etc. The costs of employing plastics materials were discussed in relation to other materials and the influence on these costs of plastics fabricating processes was considered.

In discussing the uses of plastics, typical examples of how certain industries had employed the properties previously enumerated were shown, following the steps in the evaluation processes, thereby suggesting certain lines of similarity in the building industry.

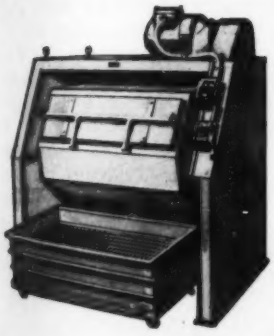
Operations

Speaking on 'The Influence of Plastics on Building Operations,' S. Greenwood, A.R.I.B.A. (Chief Architect, John Laing and Sons Ltd.) discussed a number of items — site works; materials, equipment and plant used on building operations; materials and equipment used in the construction of the building but removed before occupation; and future uses. Conclusions were given at the end of each section and overall conclusions were given at the end of the paper. The items discussed were being subjected to impartial observation as part of the company's research policy. Where materials were used as standard equipment—*e.g.*, synthetic rubber glands in hydraulic gear, they accepted that the materials were outside their scope.

Applications were next considered by the speaker who referred to patent joint strip in roads; polythene DPC, slip membrane and curing membrane; alkathene pipe to check the depth of a suspected slip plane; pore pressure installations; and concrete curing liquids. Materials, equipment and plant used on building operations were also touched upon and included poly-

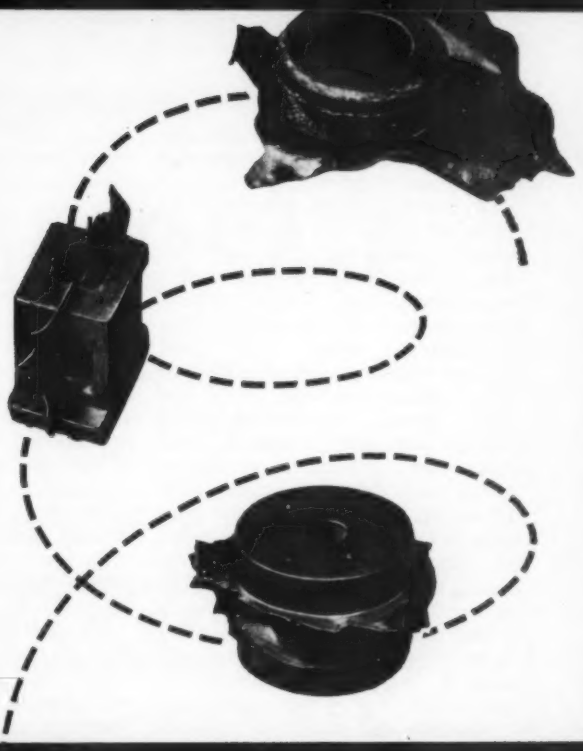
Seen during the conference at the RIBA are: 1 (*left to right*). **W. B. Brown (Senior Development Chemist, Monsanto), J. D. Hallam (John Laing), C. W. Welch (Editor, *Plastics*), G. K. Findlay (consultant architect to Unity Structures Ltd.), D. S. Mahon (sales development manager, Bakelite). 2. G. Tolley (chairman of Council, Plastics Institute), V. E. Wentworth (manager, plastics applications research, Monsanto), L. M. Read (vice-chairman of Council, Plastics Institute), C. L. Child (I.C.I. Information Services Division). 3. Jefferiss Mathews (designer of the I.C.I. Technical Service block at Welwyn, who opened the conference) and H. F. Wilson (president of the Plastics Institute)**

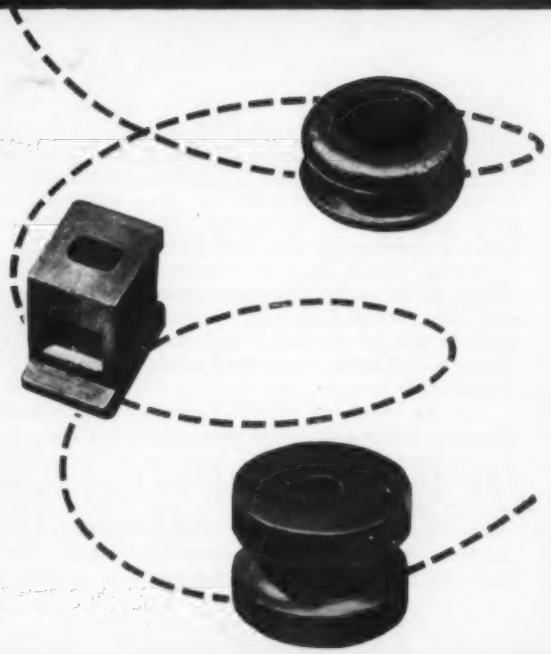
De-flash small rubber parts with 'DRIKOLD' in the Columbian International Sub-zero Tumbler



Sub-zero tumblers are obtainable from Columbian International (Great Britain) Ltd., 116 Cannon Street, London, E.C.4.

De-flash by freezing





When small rubber components are frozen in a rotating drum with 'Drikold'—I.C.I. solid carbon dioxide—flashes become brittle and the tumbling action breaks these off. Sub-zero de-flashing with 'Drikold' can cut costs, speed processes, increase production. I.C.I. Technical Service staff will advise on problems and will de-flash sample batches of components on request.

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thene sheet used for protection of building materials and draught protection, PVC sheet for tarpaulins and lorry covers, polythene pipes for temporary water supplies, inflatable bags for liquid storage and transport, reinforced plastics or polystyrene sectional tanks, reinforced plastics engine covers, cabs, etc., perspex screens, domes, covers, etc., synthetic rubber wheelbarrows, mixer drums and paddles, buckets, nylon bearings on control linkage, conveyor belts and idlers, plastics handles on tools, masonry saws plastics bonded, water level pipes, protective clothing—gloves, coats, helmets, goggles, electric wiring, signs on lorries and sites, nylon or high density polythene ropes, protection of metal, foamed and expanded plastics in stressed skin panels for site huts, workshops, etc., panels to incorporate heating elements, reinforced plastics sanitary fittings, liquid bonding agents, reinforcement spacers.

Materials and equipment used in the construction of the building but removed before occupation included polystyrene linings to formwork—polished, textured and vacuum formed, reinforced plastics moulds and formwork, pressure sensitive tapes on formwork joints, pressure sensitive tapes as shuttering and combined DPC. The speaker had much to say about the future uses of plastics and spoke of enveloping bags to completely enclose a portion of the works which must be isolated, polythene film for rapid concrete mould stripping, polyester treated paper lining to moulds to give self finish to concrete, translucent stressed skin structures, and soil stabilization.

It could be seen that within the short time during which plastics had been used by the building industry that they had established themselves in a considerable number of uses. The use of plastics was more a matter of studying the materials and finding suitable applications than by asking for materials to fulfil certain requirements. Naturally it was necessary for each industry to understand the others requirements and difficulties, a process which required constant studies to be undertaken by contractors in conjunction with plastics manufacturers. In this way they clearly would arrive at solutions much quicker.

Building standards were rising and materials which only a few years ago were regarded as expensive luxuries were now standard finishes, *e.g.* plastics worktops in housing. It was certain that as new materials became available, prices would continue to drop and the materials would become better appreciated, the scope would widen, partly to take over from traditional materials but mainly to create new markets due to the material's own unique properties.

Construction

A paper on the 'Influence of Plastics in Building: Construction,' was given by D. S. Mahon, B.Sc. (Sales Development Manager, Bakelite Ltd.). It dealt with the application of plastics materials in the actual fabric and structure of buildings, and was divided into three parts.

The first part dealt with primary structural components, those parts of a building which were prime load bearing members. The speaker dealt with such things as the use of synthetic resin adhesives in the bonding of composite timber roof beams, the actual and potential use of thermoplastic materials in damp proof courses and some recent applications of glass fibre reinforced plastics materials in structures.

The second section covered plastics and their use as secondary structural components, and covered such items as roofing materials, lightweight curtain walling units, mastics and caulking compounds, artificial stone facings, non-skid floor treatments, flooring tiles, decorative laminated panelling and house siding.

The third section dealt with actual and potential applications of plastics materials of various types in windows and light fittings in the broadest sense.

Services

W. L. Thorne (Technical Officer, Imperial Chemical Industries Ltd.) dealt with 'The Influence of Plastics in Building: Services,' in his paper. The number of applications and types of building products based on plastics, in which technically-minded architects were interested varied widely. One characteristic of these materials on which most emphasis was placed was permanence. Here plastics had a lot to offer: they warranted close examination in three contexts. (a) Reduction in sound transmission. (b) Elimination of many corrosion problems. (c) Reduction in costs—particularly maintenance costs.

The low sound transmission characteristics of polythene and PVC was considered a problem by water engineers as it increased their difficulty in location underground services. For internal work, plastic pipes both as pressure lines and waste water units reduced considerably the nuisances which could exist from noise transmission of metallic installations.

Corrosion resistance: Metals were, in general, attacked on exposed surfaces by aqueous solutions, acids and alkalis. Thermoplastics, on the other hand, were unaffected by these same media. In addition, plastics did not appear to be affected in any way by contact with soils, concrete, plaster and similar building products. The range of applications in which this property can be exploited include: Polythene and PVC pipes and fittings for water services, and under-floor heating by hot water; polythene and PVC insulated cables both for lighting, heating and under-floor heating; PVC and cellulose acetate electrical conduit; PVC water storage cisterns; PVC guttering, down pipes and stack pipes. This was one of the newer applications for plastics. Not only were the pipes being offered but also a wide range of the necessary fittings were being designed.

Reduced costs: This desirable effect was being sought in three directions. 1. By making first costs as low as possible. Comparative prices were here examined. 2. Reduced installation costs due to the lightness and ease of manipulation of plastics pipes and fittings. Here data was scanty due to absence of accurate costing. 3. Reduced maintenance costs. Thus polythene water and waste installations would not suffer frost damage; PVC guttering and down pipes would not need painting as protection against atmospheric corrosion and PVC insulated cables would not 'perish' like rubber-covered cables previously used.

(To be concluded)

GSA Rubber Offer

A spokesman for the General Services Administration said in Washington on November 24 that the offer for sale of 35,000 long tons of rubber made to the trade over the weekend was part of the continuing operation of rotating stocks. 'There is nothing new in this,' he added.

'Our inspectors go through our stockpiles and determine what should be rotated. Then they merely report this and it goes into the catalogue of what is available. It is a continuing operation. This is nothing but our normal rotation programme that has been going on for years and years. The only difference is that we may now sell up to 50,000 tons without replacement. We may schedule another 15,000 tons or another 20,000 tons; this does not mean we are going to sell it all. It means that this is ready for sale.

'We have also said that we expect to sell this year between 40,000 and 50,000 tons of rubber as authorized by the Independent Offices Appropriations Act. The scheduling of this particular amount of this particular grade does not alter the amount that we expect to sell during this fiscal year. It merely says it is available for sale.'

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Telcon Thermoplastic Sheet

NEW PLANT AT PLASTICS DIVISION

ONE of the most modern plants for the production of thermoplastic sheet has recently been installed at the Farnborough, Kent, factory of the Plastics Division of the Telegraph Construction and Maintenance Co. Ltd. Sheeting is produced in thicknesses ranging from 0.02in. to $\frac{1}{8}$in. and in widths up to 56in. Materials at present employed include high impact polystyrene; rigid and flexible PVC; polythene and polypropylene.

Slit-die head for sheet extrusion on the Reifenhäuser S 150

Basis of the plant is a Reifenhäuser S150 extruder. This machine is 17ft. long and has a 6in. diameter screw and the unusually high length/diameter ratio of 25:1. Output is from 330lb. to 550lb. There are six heating zones along the barrel, the temperature of which can be controlled within ± 1°C. The machine can, of course, be used for the production of pipes, tubes, rods extruded sections and cable sheathing, as well as the extrusion of sheet. Different designs of screw are available for handling various materials and slit-die heads of different widths can be used.

On leaving the die, the thermoplastic sheet, now correct as to width and thickness, is taken through three heavily chromed oil-heated finishing rolls, arranged in a vertical bank, which give the sheet its surface finish. The sheet next passes down an inclined roller-table of sufficient length to provide for cooling, and then through rubber covered take-up rolls, through which paper is also fed in for interleaving the cut sheets.

Immediately beyond the take-up rolls are the edge-trimming or slitting knives and the guillotine for cutting the sheet into lengths. The cutting process is linked with an automatic stacking device. The sheet is carried forward into rubber belts mounted on a retracting table. This allows the sheets, as they are cut, to drop onto a patform beneath, the platform being automatically lowered as the stack of sheets grows. The maximum length of cut sheet at present is 6ft. 6in. Longer sheets can be produced but not automatically stacked.

In order to impart a highly glossy surface to sheeting made from materials which do not naturally acquire it by the action of the finishing rolls, it is sometimes necessary to laminate a thin high-gloss film to the sheeting at the finishing stage. The film is fed into the finishing rolls and into contact with the extruded material while it is still molten and capable of forming a bond.

The entire plant is controlled from a central panel. Synchronization of the polished rollers and the rubber take-up rolls is by electro-mechanical controls.

Telcon's Plastics Division also manufactures tubing and sleeving in polythene, PVC, polypropylene and other thermoplastics. The Division

General view from delivery end of the sheet extrusion plant

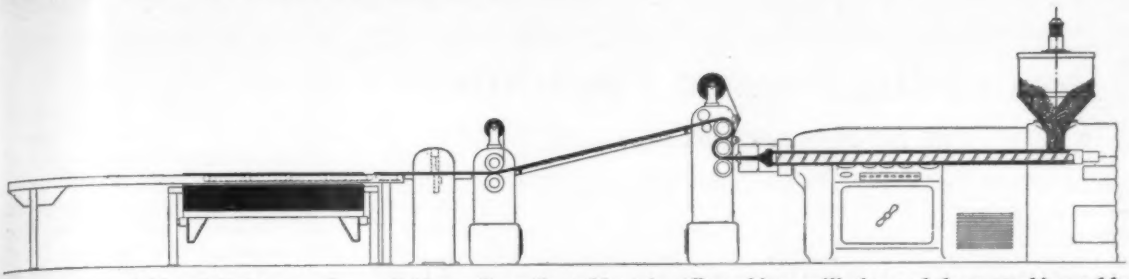


Diagram shows (*right to left*) the extruder; polishing rolls; roller table; take-off machine; guillotine and sheet stacking table

has also a large plant for the coating of paper, Kraft paper, boards, foils and other materials with polythene, up to thicknesses of 0.003in. Bone Brothers Ltd. extruders are used for coating in widths up to 72in., and the company provides an exceptionally rapid service for coating and laminating paper for consumer goods, multi-wall sacks, chipboard for drums and so on. Another product of interest manufactured at Farnborough is 'Telcomesh,' a thin polythene sheet reinforced internally with an open mesh of glass fibre, Terylene or other synthetic or natural textiles. Standard gauges are 0.016-0.017in. and 0.011-0.012in., in widths up to 36in. Burst strength is stated to be 90% greater than non-reinforced polythene of the same thickness.

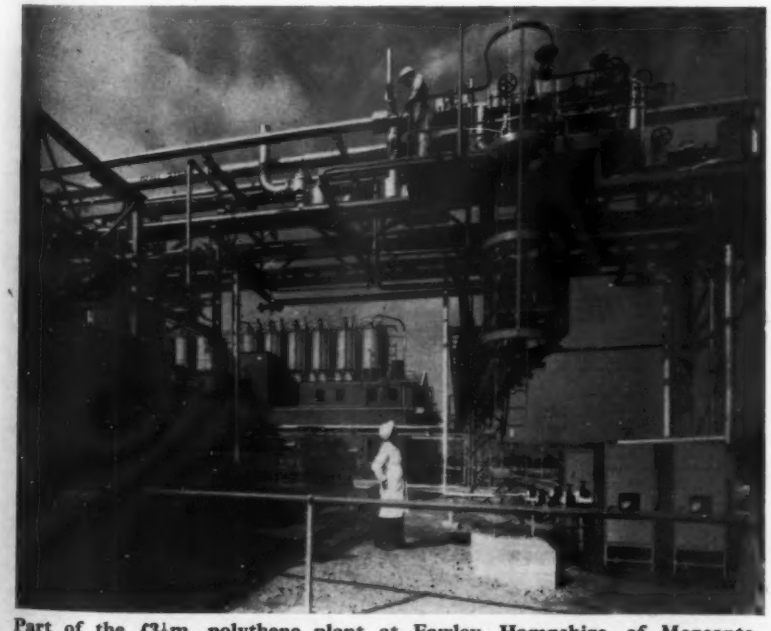
Monsanto Polythene

POLYTHENE grades being made by Monsanto Chemicals Ltd. at their Fawley, Southampton, plant have now been further described.

One of the outstanding characteristics of these grades, according to Monsanto, is their improved processability, which enables output to be increased by as much as 10% in some cases.

This is ascribed to the special flow properties of the polymer, and also to the small pellet size ($\frac{3}{32}$in.) in which the material is supplied.

Polythene film for all purposes can be extruded from the five film grades that are available. These include M.303, a compound producing a high clarity film for display packaging; M.401, a slip grade film compound which produces high clarity film suitable for produce pre-packaging and display packaging; M.301, a film for applications in which exceptional toughness rather than clarity is required; M.302, based on M.301, this compound contains 2-3% of a high-grade channel black and 0.2-0.3% of an antioxidant, and is suitable for outdoor applications over long periods of exposure; M.402, a resin which contains no slip additive and which is the base polymer from which M.401 is formulated. It is recommended for extrusion laminates or blending to reduce slip level in certain special cases.



Part of the £3½m. polythene plant at Fawley, Hampshire, of Monsanto Chemicals Ltd. In the centre of the picture is the compounding building, with the storage hoppers on the roof

Injection Moulding

Five types of polythene are being produced for injection moulding. Here again the small pellet size is of great assistance in the dry colouring of the material and provides optimum colour dispersion. The injection moulding grades are: M.301, a material of low melt index (2) claimed to have excellent physical properties including exceptional toughness and high resistance to environmental stress cracking; M.501, a general purpose material of intermediate melt index (7); M.801, a high melt index material (20) suitable for high-speed moulding; M.802, a material of the same melt index but of higher density (0.921 compared with 0.916), giving a fast flowing resin; and M.803, a material with properties similar to those of M.802 but containing a slip additive which is said to overcome the problems of articles sticking together when stacked or nested for transport or storage.

Further grades, including cable and pipe compounds, are also being manufactured.

Mr Henry A. Brandt, in view of his other business commitments, has tendered his resignation from the board of Pargola Ltd. with effect from September 30 1959. To fill the vacancy Mr Peter Augustus Brandt, the elder son of Mr Walter A. Brandt, the chairman of the company, has been appointed to the board as from October 1 1959.

Processing Newer Elastomers

IRI LONDON SECTION MEETING

IN a lecture to the IRI London Section entitled 'Processing of the Newer Elastomers,' Mr D. A. W. Izod gave an interesting account relating principally to acrylate rubbers, fluoro-rubbers and polyurethanes which have been handled at RABRM. In general, processing conditions were more critical than for NR, particularly in respect of temperature control and in view of the limited possibilities of compounding variations.

Referring to equipment, Mr Izod said that mills should be fitted for adequate cooling, have highly polished roll surfaces and provision for close fitting scraper blades. Low friction ratios gave better results and small batches should be used. Extrusion was difficult with conventional (short-barrel) rubber extruders and plastics extruders fitted with screws of decreasing pitch and high length/diameter ratios in conjunction with fine breaker plates often gave better results. Again, proper tapering of the lead-in to the die was of great importance. Moulds should be designed with proper spue and escape vents positioned very close to the cavity. Lands of $\frac{1}{16}$in. width or less gave the best results in compression moulding and these necessitated special design features such as buttressed spue grooves.

Processing difficulties with acrylate rubbers included roll sticking during mixing or re-sheeting which could not be improved by variation of the roll friction ratio. Adequate cooling was important and treatment of the rolls with low m. wt. polythene wax before mixing facilitates release. In moulding, failure to rest the stock for 24-48 hours after sheeting out led to disintegration of the moulding when the mould was opened. Mould staining could be minimized by use of silicone release agents but the best results were achieved using PTFE coated moulds although these were difficult to produce to fine tolerances.

Fluoro rubbers handled included Kel-F elastomer which gave rise to many processing problems. It was found easiest to band this rubber at about 70°C. and immediately apply cooling to the rolls to dissipate the work heat generated. It was reluctant to absorb fillers and oily materials tended to crumble the batch. Moulding was difficult, the 5,500 grade being easier than the 3,700. Peroxide cured stocks showed better flow than those containing isocyanates. Transfer moulding was beset by delamination problems despite the presence of a processing aid, Kel-F 200 wax, in the compound. Blank preparation was likewise difficult but back-rind had been improved by the use of peptizers. Blistering in the step-wise oven cure had been overcome by using a very slow temperature rise but at this stage the results of bad mould flow may become apparent in the form of uneven shrinkage, distortion and delamination. However, black filled stocks had been shown to be superior in this respect to those containing silica.

In contrast, the Vitons handled easily on cool rolls although equally reluctant to tolerate filler addition. Viton A tended to band on the fast roll, A-HV on the slow one—but in general even-speed mills gave the best results. Small internal mixer batches had been prepared successfully, best results being obtained by resting the batch before remilling. The complicated procedure for blank preparation recommended by the manufacturers had been found avoidable for simple mouldings although it was still necessary to avoid seams and joins in the blank. Back-rinding was slight but may cause difficulties with precision components; it was probably a symptom of bad mould flow and may often be overcome by increasing curing temperatures and moulding pressures above the usual 500 psi minimum.

Fluorinated silicone rubber stuck badly when banded but could be softened readily by separate passes through a cooled, tight nip. Moulded at 750 psi, using a trace of 1% Teepol solution as mould release, good results had been obtained with properly softened material. No good results had been obtained in attempts to extrude this rubber.

Adiprenes could usually be released from rolls by raising their temperature. Mould sticking was serious even in the presence of various release agents and it was advisable to cool the mould before release.

In a vote of thanks, Mr W. H. Stephens paid tribute to the practical nature of Mr Izod's lecture.

Man-Made Fibre Utilization

The 7 p.m. lecture was given by Mr G. A. Pittman, of Courtaulds Ltd., on 'The Utilization of Man-made Fibres in the Rubber Industry.' The lecture opened with an interesting film concerned with the evaluation of tyres. The lecturer then outlined the preparation and properties of the principal synthetic fibres including reference to the new Japanese mechanical fabrics based on polyvinyl alcohol. After a brief outline of terms used in describing textile properties, the stress-strain curves for the fibres were presented showing that 'Fortisan' had excellent high strength but low breaking elongation, but Nylon 600 showed much higher elongations with lower extension modulus. Rayons were being developed with higher and higher strength which show elongations between these two extremes. Adhesion problems were discussed and had been overcome in part by the use of resorcinol-formaldehyde dips, vinyl-pyridine latices and isocyanates.

Applications

In tyres, viscose rayon gave the cheapest strength although nylon was more suitable for aircraft tyres and 'Fortisan' for racing car tyres used in, for example, an attempt on the land speed record where fatigue was not a problem. In conveyor belting, thinner belts at lower cost with improved performance could replace those based on cotton. Adhesion was still the main problem and two approaches had involved the use of staple viscose and of a fabric with viscose warp and cotton weft. Nylon was too extensible in the warp direction but was useful in the weft on account of its high impact strength. Terylene was a strong competitor but was higher in cost and also suffered adhesion troubles. PVC belts had been designed with high-twist yarns to give complete strike through; an alternative being to spirally wrap the warp threads with a single PVC-coated yarn. For V-belts, viscose rayon and Terylene compete; in high-pressure hose, cotton was still favoured but viscose was competing; for fuel cells and tanks, nylon was favoured for its high strength/weight ratio, although rayon's greater stiffness may be advantageous when carrying the units on trailer vehicles. In air suspension systems, nylon was favoured for the flexible diaphragm type, viscose for the air-bag type. In footwear, 'spun dyed' yarns had assisted the introduction of synthetic fabrics and in the cable field, synthetic braidings were in common use.

Finally, they were reaching the stage where the general purpose fibre —like the general purpose rubber— had ceased to exist and each material or combination of materials was like to be recommended only for specific applications.

D. A. S.

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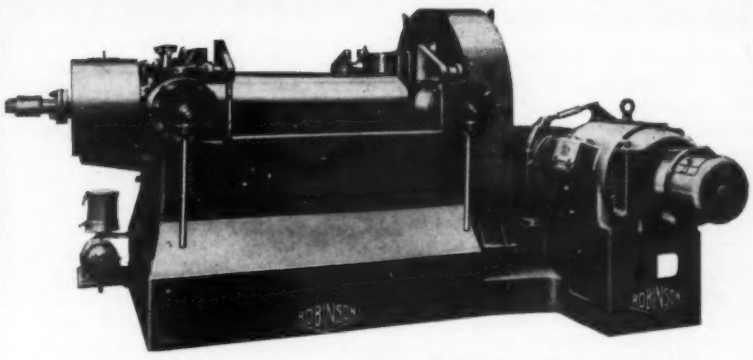

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IRI Golfing Society

MANCHESTER SECTION

THE Manchester Section of the IRI Golfing Society held their autumn meeting on September 28 at the Royal Lytham and St. Anne's Golf Club. The competition was once again played under Stableford rules and under absolutely first-class weather conditions. The fairways proved to be hard and dry and played very long, but the greens were in beautiful condition.

The competition, in which 37 people took part, was won by S. T. Diggle, with 34 points, playing off a handicap of 2. Mr Diggle won from Mr S. A. Mouseley on the last nine holes.

In the evening the members sat down to a most excellent dinner to which they invited the captain and secretary of the Royal Lytham and St. Anne's Golf Club. The section captain, Mr H. K. Mills, thanked the house chairman and staff of the club for the way in which they had received the Manchester Section and made them welcome. In response, the captain of the Royal Lytham Golf Club said how pleased he was to see us again, for the second time, and hoping we would visit them again in the coming year.

The annual general meeting was again held in the evening, following the dinner. Mr S. Heywood was elected captain of the Manchester Section for the ensuing year.

Results of the meeting (with the points scored) were:

Winner, S. T. Diggle	34
Runner-up, S. A. Mouseley	34
Third, E. Cheetham	33
Fourth, H. K. Mills	32
Fifth, A. N. Haworth	31
Sixth, H. G. Redfern	30
Seventh, G. H. Redfern	30
Best First Nine, S. Heywood	16
Best Second Nine, T. R. Waring	17
Special Prize, R. J. Mann	5

The captain and committee would like to thank the following for the donation of prizes for this event: Mr T. A. Wilson, British Recovered Rubber and Chemical Co. Ltd; Mr T. R. Waring, Imperial Chemical Industries Ltd.; Mr Frank Shaw, Francis Shaw and Co. Ltd.; Mr S. Heywood, Alfred Smith Ltd.; Mr R. J. Mann, International Synthetic Rubber Co.; Mr S. A. Mouseley, Dunlop Rubber Co. Ltd.; Mr S. T. Diggle, J. Riley and Sons, Ltd.; Mr Manketelow, Hubron Rubber Chemicals Ltd.; Mr E. Cheetham, Whitehead Chemical Co. Ltd.; Mr A. N. Haworth, Ferguson, Shiers Ltd.; Mr H. K. Mills, Rubber Regenerating Co. Ltd.—G. C. S.

WORLD SYNTHETIC RUBBER OUTPUT

Mr George R. Vila, a vice-president of the United States Rubber Company, predicted in New York last week that the world output of synthetic rubber would more than double by 1970.

Mr Vila, who was addressing the annual meeting of the Rubber Manufacturers Association, said that world-wide consumption of synthetic was expected to equal or better consumption of the natural product in 1960, with both running a little over two million long tons. By 1970, he said, consumption of rubber should be expected to climb by two-thirds to seven million tons.

He noted that the industry would be able to offer new raw materials, thanks to advances in rubber chemistry.

B.o.T. Stockpile Sales

The Board of Trade announced on November 18 that 9,300 tons of rubber, including 5,880 tons of 'old' rubber in the Board's depots, have been sold since disposal started on October 19. The Board said that sales will normally be announced only at the end of the month. The latest figure was released to give some indication of the level of sales from the Board's stockpile.

A 'good deal more' rubber has been sold for January 1960 delivery than in any other month between November and February, the announcement added.

BRR Increase Capacity

APPOINTMENTS AND DEVELOPMENTS

MR T. A. WILSON, chairman and managing director of the British Recovered Rubber and Chemical Co. Ltd., Ashton New Road, Clayton, Manchester, Joseph Anderson and Sons Ltd., Arnwest Chemicals Ltd., and of Irkdale Industries Ltd., has announced that Mr G. C. Swann, a director of the British Recovered Rubber and Chemical Co. Ltd., has joined the Board of Joseph Anderson and Sons Ltd., and of Arnwest Chemicals Ltd.

Mr A. Crook has become a director of the British Recovered Rubber and Chemical Co. Ltd. and of Arnwest Chemicals Ltd. Mr F. M. Read has become a director of Irkdale Industries Ltd. and of Arnwest Chemicals Ltd.

In addition, it is stated that the British Recovered Rubber and Chemical Co. Ltd. is to increase its productive capacity at the old works by 30% and that a site has been acquired in the Clayton, Manchester, area for future developments.

Arnwest Chemicals is to increase its capacity 100% and, in addition, a new factory is to be built to extend this company's activities.

Mr L. J. D. Mackie has been appointed a director of the Amherst Estates (Selangor) Rubber Company.

The Kleinert Rubber Co. Ltd., 91 New Bond Street, London, W.1, recently introduced its 1960 range of swim caps. Various styles are available at many prices. The two caps illustrated are the 'Face Flattering Cascade,' *left*, and the 'Hawaii,' two of the more expensive pieces, the manufacture of which involves much delicate hand work. Retail prices are 19s. 6d. and £5 5s. 0d. respectively

Rubber Statistics

UNITED KINGDOM—FRANCE—JAPAN

DETAILS are now available of the rubber position in the United Kingdom at the end of August.

Imports of natural rubber during the first eight months of the year totalled 113,524 tons of crude and 20,956 tons of latex, and after allowing for re-exports of 19,560 tons, there remained available for home consumption a new supply of 114,920 tons; this represented an increase of approximately 10,000 tons over the previous year's imports during this period. Consumption of natural rubber included 97,142 tons of crude and 17,275 tons of latex, or 114,417 tons in all, or only some 600 tons more than last year. Stocks at the end of August stood at 23,480 tons of crude and 4,934 tons of latex, stocks of crude having fallen by some 2,000 tons during the course of the year; a year earlier, they had been 16,000 tons or about 55% greater.

Imports of synthetic rubber during these months stood at a net total of 52,572 tons, compared with 43,454 tons last year, while consumption rose from 40,874 tons to 48,297 tons. Stocks of synthetic at the end of the period had fallen to 11,575 tons from 12,430 tons, at which they had stood at the beginning of the year.

Production of reclaim during these months amounted to 27,082 tons or nearly 1,000 tons more than in 1958, while after allowing for re-exports, there remained available for consumption an amount of 20,396 tons, or a few hundred tons less than the previous year. Consumption of reclaim amounted amounted to 23,042 tons, compared with 21,542 tons, and stocks at the end of August had fallen to 2,510 tons from the year-end position of 3,433 tons.

France

The Secretariat of the International Rubber Study Group has now published details of the French rubber position up to the end of June last.

During the first half of the year, French imports of natural rubber totalled 57,463 tons of crude and 5,878 tons of latex, the combined total, 63,341 tons, falling short of the previous year's figure by some 11,000 tons. This reduction is reflected in the quantity imported from Vietnam, which dropped from 31,070 tons to 17,364 tons. Imports from Malaya rose from 32,717 tons to 34,113 tons. Other countries from which France took rubber during this half-year included Cambodia (2,307 tons), Indonesia (1,688 tons), the Belgian Congo (3,979 tons), and Ceylon (2,138 tons).

Consumption of natural rubber during these months amounted to 63,166 tons of crude and 6,882 tons of latex, and fell short of the 1958 total by a little over 3,000 tons. Stocks at the end of June stood at 6,894 tons of crude and 647 tons of latex, the former having fallen by about 6,000 tons and the latter by about 1,000 tons during the course of the year.

Imports of synthetic rubber amounted to 30,097 tons, of which 21,674 tons came from the USA and 5,489 tons from Canada; this represented a reduction of about 3,000 tons compared with 1958. Consumption of synthetic totalled 33,520 tons, an increase of some 4,000 tons, and included 23,580 tons of S-type, 3,526 tons of neoprene and 4,755 tons of butyl. At the end of June stocks of synthetic totalled 5,873 tons, having fallen to this level from the year-end figure of 8,746 tons.

Japan

The Study Group also gives details of the Japanese rubber position up to the end of June.

Imports of natural rubber included 67,124 tons of crude and 6,475 tons of latex, and were some 15,000 tons or 25% above the 1958 figure. They came from Malaya (57,558 tons), Indonesia (1,746 tons), Thailand (3,315 tons), Ceylon (5,737 tons) and British Borneo (4,028 tons) and other countries (1,215 tons).

Consumption of natural rubber went up from 58,800 tons to 75,750 tons, including 69,290 tons of crude and 6,460 tons of latex. Stocks at the end of June had fallen from the year-end position of 15,079 tons to 12,929 tons, of which 11,773 tons were represented by crude rubber.

Imports of synthetic totalled 16,355 tons, of which 13,903 tons came from the USA and 2,032 tons from Canada. Consumption of synthetic amounted to 13,330 tons compared with 7,860 tons the previous year, and stocks of synthetic rose to 6,075 tons, having stood at 3,050 tons at the beginning of the year.

Company in the News

Montecatini

Domestic and export sales of the Montecatini Group for the first nine months of 1959 are up nearly 8% over the corresponding nine month period in 1958, according to Count Carlo Faina, president of Montecatini Societa Generale. Reporting on a meeting of the company's board of directors held in Milan on November 6, Count Faina stated that this increase is especially significant in view of the general price decrease that occurred during the period for a majority of the company's products sold both in Italy and abroad.

CORRESPONDENCE

Hancock's Invention

To the Editor

Sir,—Mr Panzetta's letter in your issue of November 21 gives me a welcome opportunity to amplify a statement made in my essay 'Inventions of the First Rubber Articles.' The passage queried by Mr Panzetta runs as follows: 'Often, Fresneau's discovery of the natural adhesion (of freshly cut pieces of rubber to each other HS) has been ascribed to Thomas Hancock; in reality it was made several times in the 18th century, which does not diminish the brilliant use Hancock made of it for the construction of the masticator.'

Mr Panzetta says 'This statement puts Hancock's invention in the wrong light and one cannot do better than refer to his own book published in 1857.' When we turn to Hancock's own book we find him saying (page 6), 'I had observed that when pieces with fresh cut edges had been long in the hot bath and then dried they would perfectly unite; but the outer surfaces which had been exposed would not unite however clean or however heated or pressed.' Hancock makes it quite clear that it was from this seminal observation that he went on to the construction of the masticator. It has been stated in the literature before that Ingenhousz and Grossart had made the same observation in the 18th century. The new fact which I established—to the best of my knowledge, for the first time—was that these two scientists had been anticipated by Fresneau.

From my article it was perfectly obvious that Hancock could not possibly have been influenced by Fresneau as on the previous page I had stated that Fresneau's remarks had only come to light in 1942. The undoubted fact remains that in the history of scientific ideas with which the article is concerned, the priority of the discovery of the 'natural adhesion principle' belongs to Fresneau. As, apart from the new light thrown on Fresneau, I had set out most of the relevant evidence in detail in an earlier article in this journal (April 19 and 26 1952), there was no need to repeat it on this particular occasion. Taken in the context of the whole article, I feel there is not a single word in the passage queried by Mr Panzetta that could be wrongly understood. It is a perfectly accurate statement when read in this context.

Yours faithfully,

H. SCHURER.

London, N.3.
21/11/59.

Manchester Golf Dinner

The Manchester Section of the IRI Golfing Society are to hold their Annual Dinner on January 22 1960 at the Grand Hotel, Manchester.

PATENT SPECIFICATIONS

The following information is prepared from published Patent Specifications by permission of the Controller of H.M. Stationery Office. The full Specifications can be obtained from the Patent Office, 25 Southampton Buildings, W.C.2, at 3s. 6d. per copy (including postage).

Curable Polyurethane and Polyurethane-Polyurea Polymers

No. 815,122. E. I. du Pont de Nemours and Co. Application and Filed, July 23 1956. Application in USA, August 4 1955 and July 5 1956. Published, June 17 1959.

Curable polymers are made by a process consisting essentially in reacting the bischloroformate of a polymeric glycol with a secondary diamine. The polymers are cured by an organic polyisocyanate or sulphur, or may be cured by heat alone when the polymer contains a cyclobutene ring. The polymers are superior to known polyurethanes in that they have excellent thermal stability. They are compounded similarly to rubber, and the cured polymers have outstanding resistance to abrasion and excellent resistance to direct sunlight, oxygen, ozone and oil. Examples of the preparation of the polymers are given, together with physical test results on the cured materials.

Rubbery Polyisoprene

No. 814,676. The Firestone Tire and Rubber Co. Application and Filed, August 22 1956. Application in USA, August 24 and September 1 1955. Published, June 10 1959.

Polyisoprene closely similar in properties to Hevea rubber is made by polymerizing isoprene in the presence of metallic lithium as catalyst and in the absence of oxygen, nitrogen and other components of air. Pure isoprene must be used; it should be of more than 90 mol % purity and preferably in the neighbourhood of 95 or more mol % purity. Important factors influencing the structure of the polymer and the speed of polymerization are discussed; they are as follows: (1) Purity of monomer. (2) Purity of catalyst. (3) Concentration of moisture, air and oxygen. (4) Temperature of reaction.

Comparative data for Hevea rubber and the polyisoprene of the invention are given for viscosity, molecular weight, and molecular structure as determined by infra-red spectroscopy and X-ray diffraction. The data indicate a close similarity between Hevea rubber and the polyisoprene in regard to these properties. The polyisoprene of the invention is readily plasticized by milling by the same procedure as used for Hevea rubber. The milled polyisoprene possesses very good tack so that no cement need be employed in building a tyre or other laminated product from rubber compositions containing substantial proportions of the polyisoprene. The tensile properties of a pure gum vulcanizate and the tensile and other properties of a carbon black vulcanizate of the polyisoprene were closely similar to the properties of corresponding Hevea rubber vulcanizates. Indoor tests on truck tyres all with treads of Hevea rubber and body stocks of (a) polyisoprene of the invention, (b) Hevea rubber and (c) 'cold' SBR, gave a relative average performance index as follows: (a) 112, (b) 100 and (c) 88.

Tyres having treads and/or sidewalls of polyisoprene of the invention have been compared in road tests with tyres having natural rubber treads and sidewalls. A notable difference between the two sets of tyres was that the natural rubber treads and sidewalls cracked badly in service whereas the polyisoprene tyres had very few cracks.

Polymeric Products

No. 815,168. E. I. du Pont de Nemours and Co. Application and Filed, January 14 1957. Application in USA, January 31 1956. Published, June 17 1959.

Polymers are made by reacting phosgene, a diacyl halide or an organic diisocyanate with a polymeric diamine of the formula $H_2N.R.NH_2$, where R is a bivalent polymeric radical. This radical is obtained by the polymerization of an ethylenically unsaturated monomer such as butadiene, isoprene, chloroprene, etc. The polymers may be made in one operation in the form of elastic products resembling vulcanized rubber, or they may be made in two or more operations, including the isolation of a plastic and curable intermediate product and its subsequent curing by the addition of appropriate agents. The polymer is cured with a diisocyanate or by agents normally used for the curing of rubber, the choice of curing agent depending upon the constitution of the polymer molecure.

The cured products have excellent resistance to heat and cold and to direct sunlight, oxygen, ozone and oil. They have outstanding resistance to abrasion and to deterioration caused by flexing or stretching, and some of the products are flexible down to −70°C. Examples of the preparation of the polymers are given together with physical test results on the cured materials. Two of the examples relate to the formation of fibres from the polymers.

Shorter Abstracts

Polymerization Catalyst. 814,668. Imperial Chemical Industries Ltd. Filed, April 24 1957.—A polymerization catalyst comprises an organic hyponitrite in which the organic residue contains at least one ether oxygen atom, preferably attached to an alpha carbon atom. The catalyst is used for the polymerization of ethylene (generally at high pressure) and other ethylenically unsaturated compounds.

Chlorinated Polythene. 815,086. Petrochemicals Ltd. Filed, February 7 1956.—Polythene prepared by the Ziegler process is dispersed in water or in an inert organic solvent and the dispersion treated with chlorine to produce chlorinated polythene.

Disposable thin-walled beakers are now being produced by Mono Containers Ltd., Cumberland Avenue, Park Royal, London, N.W.10. Moulded in 'Styron 440' polystyrene manufactured by British Resin Products Ltd., the beakers are made by a special vacuum-forming process which ensures a continuous output and unvarying quality. In four sizes—7, 8, 10 or 12 oz.—the beakers cost 67s. 6d. per 1,000 (7- and 8-oz.) and 82s. 6d. per 1,000 (10- and 12-oz.)

Rubber Markets

LONDON

With every sign that the so-called squeeze on spot rubber is now ending there has been quite a marked decline in prices in the London market over the past week. The supply of rubber to the Communist countries, one of the main reasons for the acute shortage for other consumers, appears to be nearing completion and it is said that Russia is now unwilling to enter into new commitments unless prices come down. In the case of spot rubber the price on the week is a full 2d. lower at 35¾d. The market has, of course, nearly always been dominated by Eastern advices.

Latest prices are as follows:

No. 1 RSS Spot: 35½d.-36d.

Settlement House:

December 35½d.-35¾d.
January/March 33⅞d.-34d.
April/June 31⅝d.-31⅞d.
July/September 30⅞d.-31⅛d.
October/December 29⅝d.-30⅛d.

No. 1 RSS cif basis ports:

December 35⅝d.-36d.
January 34½d.-34⅝d.

Godown:

December 123¾ (Straits cents).

LATEX

Centrifuged latex per gallon in drums, December shipment 22s. 6d., January 22s. 3d., February 22s., cif European ports. Spot, 23s., January 22s. Bulk, not quoted. Creamed, seller, December, 22s. Normal, seller, 16s. 4d.—December/January.

AMSTERDAM

The Amsterdam rubber market ruled as under on November 23:

No. 1 RMA	Guilders per kilo Nov. 23	Previous
November	3.70	3.70
December	3.70	3.70
January	3.49½	3.50
February	3.44½	3.50
March	3.43½	3.50
Jan./March	3.44½	3.50

Sales: 30 Tendency: Easier

BANGKOK

No. 1 RSS

The price for No. 1 RSS, at Bangkok on November 23 was 38.87½ (39.12½) US cents per lb.

SINGAPORE

The market opened lower on November 23 on the news of the release of 35,000 tons of high-grade sheet by the US General Services Administration and prices fluctuated within narrow limits in quiet trading. There was fair interest in lower sheets but sellers were reserved. Factories were small buyers. The market was more active in the afternoon and prices tended to improve towards the close. The turnover was fair. The market finished on a quiet note.

	Malayan cents per lb. fob Malayan ports to open ports Close	Previous Close
No. 1 RSS, Dec.	128 –128½	131¾–132½
Jan.	123½–124	126 –126½
No. 2 RSS, Dec.	126 –127	129½–130½
No. 3 RSS, Dec.	122½–123½	125½–126½
No. 4 RSS, Dec.	119 –121	122½–124½
No. 5 RSS, Dec.	116 –118	119 –121
No. 1 RSS, Spot	140 –141½	144 –145
RMA No. 3 blanket, thick remilled, Dec...	116 –118	118 –120
Int. No. 1 fine pale crepe, Dec.	135½–137½	138 –140
2X thin brown crepe, Dec. ..	117 –118	119 –120

Tone: Quiet

The Industries Syndicate quote latex, native produce, 60% centrifugal, packed in rectangular drums fob at 238.00d. per gallon.

CEYLON

No. 1 RSS

The price for No. 1 RSS Spot, at Colombo on November 23 was 152 Ceylon cents per lb.

NEW YORK

The New York rubber market ruled as under on November 23:

DEALERS' PRICES

	Ex-dock, US cents per lb. Nov. 23	Previous
No. 1 RSS, December..	42n	44¾n
January ..	41⅝n	—
No. 2 RSS, December..	41⅝n	44½n
January ..	41⅜n	—
No. 3 RSS, December..	41½n	44¼n
January ..	41⅛n	—
No. 1 RSS, Spot ..	43n	46½n
No. 3 Amber blanket, crepe, February ..	39½n	—
No. 1 Latex, thin crepe, December	Unquoted	
No. 1 Latex, thick crepe, December	Unquoted	

FUTURES—REX CONTRACT

	US cents per lb. Close	Prev. Close
Nov. ..	42.50b–43.00a	45.50b–46.00a
Jan. ..	41.60t	43.10t
March ..	38.70b–38.90a	39.80b–40.00a
May ..	38.00t	38.70t
July ..	37.05b–37.15a	38.00b–38.25a
Sept. ..	36.60b–36.85a	37.40b–37.60a
Nov. ..	36.20b–36.45a	37.00b–37.20a

Sales: 136 Tone: Easy

Rubber futures were easy on November 23, declining by more than a cent per lb. in early dealings on commission house selling following the announcement by the GSA of the availability of 35,000 long tons of rubber for sale to the trade at two cents below the market price. Rubber futures showed some improvement in afternoon dealings and covering was paring the earlier decline. The trading volume was moderate. Physical rubber was quiet. In late dealings, nearbys were easy but other positions were holding. In physical rubber, factories continued to be inactive buyers. Shipment offerings from the East were still limited in quantity.

DJAKARTA

The market closed quiet on November 23. Only two tons of sheet No. 1 for ready delivery were sold at 54.50 rupiahs.

	Rupiahs per kilo Nov. 23	Previous
Spot, No. 1 Priok ..	51.50b	51.00b
Spot, No. 2 Priok ..	50.50b	50.00b
Spot, No. 3 Priok ..	49.50b	49.00b
No. 1 fine pale crepe, spot	47.25b	47.00b

Tone: Quiet

RUBBER GOODS TO USSR

JAPANESE EXPORT PLANS

JAPANESE exporters of rubber goods hope to export products to the Soviet Union to the value of about $US12,670,000 in 1960, 14,350,000 in 1961 and 16,730,000 in 1962.

The Japan Rubber Manufacturers' Association announced this in Tokyo on November 18 after conducting an investigation for the Trade Ministry in preparation for the forthcoming talks on a third Soviet/Japanese trade agreement in Moscow next January.

The figures given above represented 23% in 1960, 27% in 1961 and 31% in 1962 of the total of $43,348,000 worth of rubber articles exported overseas by Japan in 1958. An Association spokesman said Japanese exporters were hoping to export to the Soviet Union twelve varieties of rubber goods including inner tubes for car tyres, rubber-soled footwear and rubber coatings.

Direct Trade in Rubber

Rubber traders in Malaya have been asked to promote 'direct trade' with consuming countries by Mr Tee Teh, president of the Federation of the Rubber Trade Association. Only then would it be possible, he said, to assess their actual needs and take steps to meet these without undue interference from outside speculation.

Mr Tee Teh, who was speaking at the Federation's annual general meeting, said that this year Malayan rubber production would reach almost 700,000 tons a year and would next year overtake Indonesian production. Just now there seemed little reason for pessimism. There was a surplus of consumption over production.

Industry INTELLIGENCE

Technical Data

Polyurethane Flexible Foams of High Modulus

Polyurethane flexible foams based on polyesters are particularly effective for incorporation in facia panels of cars for additional protection of the occupants against severe mechanical shock. However, the normal polyester resins and isocyanates used in the manufacture of blocks do not yield flexible foams possessing the high modulus considered necessary for facia panel crash pads while the short time available for manipulation before foaming takes place is a drawback in moulding operations. In order to overcome these difficulties, Daltocel DA and Suprasec DA have been developed, and their properties and use for making polyurethane foam are described in Technical Information—Urethane PC/U.4 issued by the Polymer and Chemicals Service Department, Dyestuffs Division, Imperial Chemical Industries Ltd.

Daltocel DA and Suprasec DA are mixed by a simple stirring technique and react slowly enough to permit a considerable amount of spreading to be carried out before the foam starts to rise. Such a mixture is particularly effective in filling vacuum-formed plastic articles such as those made from styrene-butadiene-acrylonitrile copolymer. In the preparation of foam-padded facia panels, arm rests, etc., the vacuum-formed plastic is placed in a similarly shaped mould and the Daltocel DA/Suprasec DA mixture is poured into the hollow plastic shape by hand from the cup used for the mixing operation. The technique involved, including the mixing of the Daltocel DA with the Suprasec DA, is described in detail in the bulletin, data for the density, compression set and compression modulus of the foam being included.

Increasing the Tensile Strength of Neoprene Type WB

The simple addition of elemental sulphur to a Neoprene Type WB mix will increase the tensile strength of the vulcanizate by approximately 20%. It is believed that the sulphur enters into the curing reaction by the formation of additional cross-links. Data illustrating the effect of adding sulphur to Neoprene Type WB mixes are given in Du Pont Report BL-358, distributed in the UK by the Du Pont Co. (UK) Ltd., 76 Jermyn Street, London, S.W.1.

Four compounds were used in the investigation. Compound A represents a typical clay-loaded Neoprene Type WB mix, while compounds B and C show the effect of adding 0.5 and 1.0 part of elemental sulphur. Compound D offers a good alternative curing system which utilizes 1.0 part of sulphur and provides excellent processing safety, rapid cure rate and good physical properties. It is well established that sulphur in Neoprene compounds is detrimental to compression set and heat resistance of the vulcanizates, and sulphur should not therefore be used when these two properties are of paramount importance.

Calcium Silicates in Natural Rubber Compounds

Microcal 160 and Microcal 210, two calcium silicates, have been tested in a natural rubber base compound in loadings of 20, 40, 60, 80 and 90 phr by weight. The results are reported in Progress Report No. 3, issued by Joseph Crosfield and Sons Ltd., Warrington, Lancs.

Data are given for the tensile strength, elongation at break, modulus, tear strength and hardness of all the vulcanizates, and for compression set and tension set of the 20 and 40 phr loadings. Both the Microcals are easily incorporated in the natural rubber compound at all the loadings. As the loading of each Microcal is increased from 20 to 90 phr, tensile strength and elongation at break steadily fall, hardness and modulus progressively increase, while tear strength tends to fall off at loadings of over 60 phr. Microcal 210 generally imparts lower tensile strength, elongation at break and tear strength than Microcal 160 at the same loading but a slightly higher hardness.

Peroxide Curing of Nitrile Rubber

The properties of a nitrile rubber compound cured with dicumyl peroxide have been compared with similar compounds cured with (a) normal sulphur content, *i.e.*, 1.5 phr, and (b) low sulphur content, *i.e.*, 0.5 phr. The results are reported by W. J. Abrams in Polysar Technical Report No. 8:7B, distributed in the UK by Polymer (UK) Ltd., Walbrook House, Walbrook, London, E.C.4. The nitrile rubber used was Polysar Krynac 803 but similar results could be expected with other Polysar Krynac grades.

Di Cup 40C was used as the peroxide curing agent in a proportion of 4.4 phr, making available about 1.75 phr of active dicumyl peroxide. Data are given for the following properties of the vulcanizates: Hardness, modulus, tensile strength, elongation at break, tear strength, compression set and Gehman freeze point. The changes in the first four properties as a result of ageing in air and in oil are also reported. Compression set was the only property which showed a marked difference between the peroxide-cured compound and the normal sulphur-cured compound. Peroxide curing provides as low a compression set as could be obtained with a low sulphur cure and has the advantage over the latter of lower cost. The low compression set obtainable with peroxide-cured Polysar Krynac rubbers should be an advantage in oil seals, gaskets and similar applications.

Machines, Materials and Equipment

Cable Eccentricity Monitor

The Addison Electric Co. Ltd., 10/12 Bosworth Road, London, W.10, have recently extended the scope of their cable eccentricity monitors. These equipments which are already widely used all over the world for the monitoring of concentricity of conductors or sheaths within the dielectric during the extrusion of wires and cables, are designed on the building block principle. The range of units comprises, apart from the individual Indicator Units for horizontal and vertical eccentricity, a cathode ray display unit for the pictorial representation of the cable cross-section at any instant, strip chart recording units, warning signal units, and control units for the automatic correction of eccentricity. A new building block consists of a push button selector switch unit which allows the monitoring of any one of a maximum number of four gaugeheads from one main instrument, whereby the four gaugeheads are mounted in different extrusion lines. This new mode of operation is considerably more convenient than the portable use of a single gaugehead, and is less likely to result in accidental damage; it is also considerably more economical than the use of four complete monitoring systems. The various building blocks, moreover, are designed so that they will blend into a unified central extrusion control station with other cable control equipments of the Addison range, such as capacitance monitors, optical and contact diameter gauges, high frequency spark testers, etc.

New Publications

Plastics Today—2

The second edition of the I.C.I. publication 'Plastics Today,' includes features on the applications of a number of the company's products. Articles appear on: A New Transatlantic Telephone Link, X-ray Diffraction Equipment, 'Diakon' Acrylic Polymer, Designing Vinyl Polymers for Specific Applications, and an item entitled People and Places. This booklet, which is exceptionally well illustrated and produced, is printed on paper coated with a material incorporating 'Butakon' Latex ML501.

TRADE MARKS

Objections to the registration of any of the undermentioned applications may be lodged with the Comptroller-General of Patents, Designs and Trade Marks at the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, within one month of the date mentioned. The objections must be stated on Trade Marks Form No. 7, cost £2, obtainable through any money order office. The extracts—from 'The Trade Marks Journal'—given below are reproduced by permission of the Controller of H.M. Stationery Office.

BOLTAFLEX (788,794) For plastics included in Class 17 in sheet form. By the General Tire and Rubber Co., 1708 Englewood Avenue, Akron, County of Summit, State of Ohio, USA. Address for service is c/o Mewburn, Ellis and Co., 70-72 Chancery Lane, London, W.C.2. To be associated with No. 783,056 (4213, 377) and another. (Class 17; September 16 1959.)

QUILAFOME (787,950) For textile piece goods; table cloths, table covers and bed covers, all made of textile materials or of plastics. By the British Quilting Co. Ltd., Holt Mill, Waterfoot, Rossendale near Manchester, County of Lancaster. To be associated with No. 766,857 (4149, 56). (Class 24; September 16 1959.)

ACRILAN

(769,788) For all goods included in Class 25 made of acrylic plastics. By The Chemstrand Corporation, Decatur, State of Alabama, USA. Address for service is c/o Stevens, Langner, Parry and Rollinson, 5 to 9 Quality Court, Chancery Lane, London, W.C.2. To be associated with No. 775,378 (4197, 1296) and others. (Class 24; September 16 1959.)

RUBBATEX (779,214) For baskets made of rubber. By S. and J. H. Swinnerton Ltd., Derby Works, Manchester Road, Bury, Lancashire. To be associated with No. 779,215 (4230, 880). (Class 20; September 23 1959.)

CAPOPLASTIC (788,376) For bituminous preparations (not being paints) containing asbestos, being goods in plastic form for use in building for sealing and waterproofing purposes. By the Cape Asbestos Co. Ltd., 114 and 116 Park Street, London, W.1. To be associated with No. 785,257 (4222, 603). (Class 19; September 23 1959.)

NEW COMPANIES

Vianne Products Ltd. (632,657).—July 14. Capital: £2,000 in £1 shares. To carry on the business of manufacturers, producers and makers-up of and dealers in plastic and synthetic fillings for use in the furniture, plumbing and engineering trades, etc. The directors are: Frances J. Mann, 21 Hendon Rise, The Wells Road, Nottingham, director of F. J. Mann and Co. Ltd., and Richard W. Tyzack, 470 Mansfield Road, Sherwood, Nottingham, director of Walter Danks and Co. Ltd., etc. Solicitors: Huntsman, Donaldson and Tyzack, Nottingham.

Future Events

INSTITUTION OF THE RUBBER INDUSTRY

Burton-on-Trent Section.—Monday December 7 at the Midland Hotel, Burton-on-Trent, at 7.30 p.m. 'Direct Vulcanization of Rubber-Soled Footwear,' by F. Baynes (Dunlop Footwear Ltd.).

Merseyside Section. — The meeting due to be held on December 7 has now been *cancelled*.

North-Eastern Section. — Monday December 7 at the Eldon Grill, Grey Street, Newcastle, at 7 p.m. 'Protection of Chemical Plant,' by L. Crompton (Dunlop Rubber Co. Ltd.).

Export Opportunities

Erasers for New Zealand

The Director General (Stores Division) General Post Office, Wellington, New Zealand, invites tenders for the following requirements: 6,480 erasers, typewriter, circular with nickelled washers; 7,920 erasers, ink, approximately 24 to the lb.; 18,000 erasers, pencil, approximately 36 to the lb. The erasers are to be branded 'N.Z. Govt.' if practicable. Samples of the erasers it is proposed to supply must be submitted with the quotation. Closing date is December 15 1959. B.o.T. reference: ESB/27492/59.

Bias Binding for US

A. M. Kroop and Sons, P.O. Box 106, 'C' Street, Laurel, Maryland, have informed the British Consulate at Baltimore that they would like to get in touch with UK manufacturers of bias binding cut from plastics coated fabric. Manufacturers interested in this enquiry should write by air mail direct to the US concern. It is important that quotations should show fob and cif prices in US currency. It would be appreciated if responding firms would copy their initial correspondence to the British Consulate, Suites 611 and 612, Keyser Building, Calvert and Redwood Streets, Baltimore 2, Maryland, to enable the enquiry to be pursued. B.o.T. reference: ESB/24724/59.

The address of the Export Services Branch of the Board of Trade is Lacon House, Theobalds Road, London, W.C.1. Telephone number: Chancery 4411, extensions 776 or 866.

PATENT LIST

Printed copies of the Specifications in the following list, published by permission of the Controller of H.M. Stationery Office, can be obtained from the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, price 3s. 6d., including postage, but about six weeks after the date of this publication will usually elapse before they come available. Orders with remittance may be sent in advance to the Patent Office, and will be fulfilled immediately the Specifications are published.

COMPLETE SPECIFICATIONS ACCEPTED

Open to public inspection on September 9 1959

E. M. Cromwell and Co. Ltd. Synthetic resin adhesives and method of using same. 819,718.

K. Ziegler. Process for the production of polythenes and catalysts therefor. 819,867.

National Research Development Corporation. Cellulosic materials in sheet form. 819,782.

Farbwerke Hoechst Aktiengesellschaft Vorm. Meister, Lucius and Brüning. Manufacture of polythene-terephthalate capable of being spun. 819,721.

McNeil Machine and Engineering Co. Press for shaping and vulcanizing pneumatic tyres. 819,871.

Firestone Tire and Rubber Co. Automobile suspension. 819,728.

Polymer Corporation Ltd. Grafting of polymerizable compounds on to pre-formed polymers. 819,651.

Union Carbide Corporation, formerly Union Carbide and Carbon Corporation. Epoxy resin compositions. 819,809.

General Electric Co. Method of increasing the solvent-resistance of polythene. 819,810.

Imperial Chemical Industries Ltd. Colouring cellulosic textiles. 819,585.

A. Windmoller and M. Gennerich [trading as Windmoller and Holscher]. Bags formed from thermoplastic or thermoplastic-coated sheet material. 819,967.

Dunlop Rubber Co. Ltd. Apparatus for separating tyre beads from wheel rim flanges. 819,878.

Hercules Powder Co. Processes for vulcanizing natural and synthetic rubber latices. 819,669.

Bakelite Ltd. Alkyd resins. 819,746.

G. L. Cabot Inc. Carbon black process. 819,823.

Soc. Rhodiaceta. High polymers. 819,679.

Imperial Chemical Industries Ltd. Depolymerization of cyclic polymers of 8-caprolactam. 819,683.

Solvay and Cie. Fireproof unsaturated polyester resins. 819,684.

Wednesbury Tube Co. Ltd. and E. Cartlidge. Couplings for pipes of thermoplastic materials. 819,754.

J. P. Guimaraes. Vehicle tyres. 819,756.

Vickers-Armstrong (Aircraft) Ltd. and R. Williams. Manufacture of curved lengths of plastic pipes and similar tubular bodies. 819,831.

Phillips Petroleum Co. Halogenated synthetic polymers. 819,702.

Lowe Paper Co. Extrusion coating of web material with plastic material. 819,606.

Goodyear Tire and Rubber Co. Catalyst. 819,610.

Dow Chemical Co. Process for preparation of filamentary articles from polymer latices. 819,843.

Rubber Journal and International Plastics **CLASSIFIED ADVERTISEMENTS**

APPOINTMENTS VACANT

6d. a word, Minimum 10/-. Box 2/-.

RUBBER manufacturers (London area) require works chemist to take charge of laboratory. Experience in the manufacturing and processing of resin rubber sheeting for the shoe trade essential. Permanent position. Apply giving full details of previous experience, qualifications, and salary required to Managing Director.—Box 305. (305)

APPOINTMENTS VACANT (continued)

RUBBER technologist required for development and process control in the field of fabric proofing. Some experience in this field desirable but not essential. Five-day week, contributory, pension and life assurance scheme. Applicants should give full personal details with qualifications, experience and approximate salary required to:—The Secretary, The Northern Rubber Co. Ltd., Retford, Notts. (334)

APPOINTMENTS VACANT

BTR

Arising from Promotion, Relocation or Retirement, these vacancies exist and in each case may be expected to provide opportunities for advancement, either at the same location or by subsequent transfer within the BTR Group.

Whilst we are looking for men (age 25-40) with A.I.R.I. A.P.I., H.N.C., or of degree standard, preferably with some experience, we will also consider young men who wish to obtain higher qualifications by part-time study.

BURTON-ON-TRENT

PHYSICIST/CHEMIST (Ref. BPT) to take charge of test laboratories.

RUBBER TECHNOLOGIST (Ref. DCB) to carry out DEVELOPMENT work on new, also established, products from a wide range.

LEYLAND

RUBBER TECHNOLOGISTS (Ref. LT) for process control and product development of HOSE, or CONVEYOR BELTING.

LONDON

DEVELOPMENT DESIGNER (Ref. HPH/D) to design HOSE COUPLINGS and assemblies for HYDRAULIC and PNEUMATIC applications.

SENIOR RUBBER TECHNOLOGISTS (Ref. SRT) for compounding, process control and product development of ROLLER COVERINGS.

SENIOR EBONITE TECHNOLOGIST for compounding, process control and product development of EBONITE MOULDINGS.

SENIOR PLASTICS TECHNOLOGIST for technical control and product development of increasing range of industrial products.

Applications, which will be treated in strict confidence, should include tabulated details of education, experience, etc., also advertisement reference. Send to:—

The Group Personnel Officer
BTR INDUSTRIES LTD.
Herga House, Vincent Square, London, S.W.1 (330)

EBONITE technologist wanted for factory in London area, to take charge of compounding and process control of ebonite mouldings. This vacancy arises because of retirement and the successful candidate could expect a starting salary commensurate with qualifications and experience, but not less than, say, £900 to £1,200 p.a. There are very real prospects of advancement both in salary, also in status and range of responsibilities for the right man. Applications, giving age, qualifications and details of experience will be treated in confidence.—Box 329. (329)

APPOINTMENTS VACANT
(continued)

CHIEF chemist required by company specializing in rubber and plastics. Candidates should be aged between 30-35 years. Pension scheme and good working conditions. Apply in writing stating full particulars of past experience, etc., to Box 337. (33)

COMPANY specialising in sponge and general moulding require chief chemist to take charge of existing laboratory and staff. Candidates should be aged between 30-40 years and have qualifications not less than A.I.R.I. standards. Salary will be commensurate with qualifications but not less than £1,500 p.a.—Full details of past emplyoment to Box 299. (299)

RUBBER IMPROVEMENT LIMITED
WELLINGBOROUGH

require

Departmental Production Manager for their very Modern Rubber Factory manufacturing Soling Sheets, floorings, mechanicals, etc. Applicants must be qualified to control output from the Drug room through Compounding Dept. and Press Shop to Despatch Stores. Proved record of success in similar position and knowledge of modern production methods and handling of labour essential. Non-contributory Pension and Life Insurance schemes operate. Write in confidence giving fullest commercial and personal particulars and salary required to:—The General Manager. (330)

FOREMAN required for trimming department of rubber company. In addition to rubber experience, mechanical knowledge would be an advantage. Pension and life assurance scheme. Five-day week.—Apply Andre Rubber Co., Ltd., Kingston By-Pass, Tolworth, Surbiton, Surrey. (287)

INSPECTION. South-West London rubber manufacturers require inspectors experienced in: 1, Press moulding work; 2, proofed fabric and calendering. Experience in the rubber industry is essential. The positions are permanent and superannuable. Applicants are invited to submit full details to:—Box 335. (335)

QUALIFIED rubber technologist required for development and process control in the manufacture of rubber thread. This is a senior laboratory appointment with ample scope for development. Applications which will be treated in strict confidence should state, age, education, qualifications, experience, and salary required, and should be addressed to:—The Secretary, David Moseley and Sons Ltd., Chapelfield Works, Ardwick, Manchester, 12. (328)

COMMONWEALTH OF AUSTRALIA
AUSTRALIAN DEFENCE SCIENTIFIC SERVICE

ELASTOMER STABILIZATION

The Department of Supply invite applications for the following vacancy at Defence Standards Laboratories, Melbourne:—

POSITION: SENIOR SCIENTIFIC OFFICER — Salary £A2,155/2,320.

DUTIES: Responsible for directing the activities of a small Section of the Materials Division. The initial research programme is a study of the causes of deterioration in elastomers, with the object of developing means of stabilizing these materials. Other special projects in the field of chemistry will be added to the programme.

QUALIFICATIONS: Honours degree in Science, with Chemistry, preferably Organic, as major subject and considerable research experience, or other academic qualifications and research achievements considered equivalent. A knowledge of microchemistry, spectrophotometry, chromatography, photography or general analytical techniques would be an advantage.

Defence Standards Laboratories engage in a wide range of research and development work for the Armed Services and are very well equipped for work in the chemical field. The most modern apparatus is available including that for vapour phase chromatography, infra-red spectrophotometry, X-ray diffraction and electron microscopy.

CONDITIONS: The position is permanent and the appointee will be required to contribute to the Commonwealth Superannuation Scheme upon confirmation of appointment. This is normally six (6) months after medical examination and probationary appointment. First-class sea or air fares to Australia for the appointee, his wife and dependent children, will be paid by the Commonwealth.

APPLICATIONS: Forms obtainable from Senior Representative (AV.32/5), Department of Supply, Australia House, Strand, London, W.C.2, with whom completed applications should be lodged by 20th December, 1959. (336)